A COMPARATIVE STUDY OF INTRATHECAL MAGNESIUM SULPHATE VERSUS FENTANYL AS AN ADJUVANT TO BUPIVACAINE

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BY

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Dedicated

to

my family

&

teachers

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ABBREVIATIONS

µg	Microgram
ASA	American Society of Anaesthesiologists
BP	Blood Pressure
BMI	Body Mass Index
CNS	Central Nervous System
CSF	Cerebrospinal fluid
CVS	Cardiovascular System
DBP	Diastolic Blood Pressure
ECG	Electrocardiogram
HR	Heart Rate
Hrs	Hours
ht	Height
Kg	Kilogram
Kg/m^2	Kilogram per metre square
MAP	Mean Arterial Pressure
Max	Maximum
Min	Minute
mL	Milliliters
mmHg	Millimetres of Mercury
POST OP	Post-operative
RR	Respiratory Rate
SAB	Subarachnoid Block
SBP	Systolic Blood Pressure
SD	Standard deviation
SpO_2	Peripheral Oxygen Saturation
VAS	Visual Analogue Scale

ABSTRACT

Introduction– Spinal additives to local anaesthetics are used to increase the duration and quality of subarachnoid block. Opioids like fentanyl and non-opioids like magnesium sulphate have been investigated to compare and find a better adjuvant among the two.

Objectives - To compare intrathecal fentanyl and magnesium sulphate as adjuvants to 0.5% hyperbaric bupivacaine in terms of onset and duration of sensory and motor block and haemodynamic parameters.

Methods - : A total of 100 patients of ASA grade I and ll of age groups 18 to 70 years of either sex were selected and divided into 2 groups of 50 each. It was a double blind, randomised controlled study. Subarachnoid block was performed and group 1 received 2.5 mL of 0.5% hyperbaric bupivacaine + 0.5 mL of fentanyl (25 µg) and group 2 received 2.5 mL of 0.5% hyperbaric bupivacaine + 0.2 mL of magnesium sulphate (100 mg) + 0.3 mL of distilled water making intrathecal drug volume of 3mL in each group. Sensory and motor block characteristics and perioperative haemodynamic parameters were recorded.

Results– Group 1 had faster onset of sensory and motor block as compared to group 2. Both the groups were statistically comparable in terms of duration of sensory and motor block, highest level of sensory block attained, time to attain the highest level of sensory block, time of 1st analgesic requirement, post-operative VAS scores and intra and post-operative haemodynamic parameters.

Conclusion – Fentanyl was a better spinal adjuvant to 0.5% hyperbaric bupivacaine as compared to magnesium sulphate because of faster onset of sensory and motor block but both the agents had similar duration of block, post-operative analgesia and haemodynamic parameters.

Keywords – subarachnoid block; hyperbaric bupivacaine; fentanyl; magnesium sulphate; postoperative analgesia

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INTRODUCTION

Subarachnoid block (SAB) is the most preferred anaesthetic technique for lower limb orthopaedic surgeries. It has the advantage of being a simple technique providing both sensory and motor blockade with good muscle relaxation while the patient remains conscious. Local anaesthetics like bupivacaine are used to provide SAB. When used alone, they are required in higher doses which can cause haemodynamic instability like bradycardia and hypotension.[1,2] These higher doses can cause myocardial depression, heart block, ventricular arrhythmias and CNS toxicity presenting as dizziness, vertigo, circumoral numbness, convulsions and coma. So, it is advisable to add adjuvants to local anaesthetics so as to reduce their dose required.

Various adjuvants are thus added to local anaesthetics in order to reduce their dose required, potentiate the block, prolong the post operative analgesia and finally reducing the side effects.[3] Both opioids and non opioids can be used as adjuvants. These adjuvants have direct analgesic action on spinal cord and nerve roots with the advantage of motor block sparing.

Opioids like fentanyl cause opioid receptor activation located on dorsal horn of spinal cord and cerebral opioid receptor activation. They prolong the analgesia but their vascular absorption can lead to side effects like respiratory depression, nausea, vomiting, pruritis and urinary retention.[3,4]

Non opioids, in addition to prolonging the duration of analgesia, are devoid of side effects associated with use of opioids like nausea, vomiting or respiratory depression. Non–opioid adjuvants include magnesium sulphate, neostigmine, ketamine, midazolam, adenosine and NSAIDS.[5] Magnesium sulpate is a non opioid used intrathecally with local anaesthetics. It is a centrally acting NMDA antagonist. Painful stimuli release aspartate and glutamate which cause calcium entry into cells

leading to pain signaling. NMDA receptor antagonism in the dorsal horn of spinal cord by magnesium inhibits this signaling preventing central sensitization from peripheral nociceptive stimuli.[6,7] It acts as a physiological antagonist of calcium and by this action in the CNS, it acts as an antinociceptive.[8,9] It does not cause side effects associated with opioid receptor activation like nausea, vomiting, respiratory depression, itching and urinary retention.

We proposed a study to compare fentanyl and magnesium sulphate as adjuvants to bupivacaine for subarachnoid block in terms of effect on haemodynamic parameters, onset and duration of sensory and motor block and the quality of post-operative analgesia for 6 hrs after surgery. Hence, this prospective, double blind randomized contolled study was done to compare fentanyl and magnesium sulphate as adjuvants to bupivacaine in subarachnoid block in lower limb orthopaedic surgeries.

AIMS AND OBJECTIVES

To compare intrathecal fentanyl and magnesium sulphate as adjuvants to bupivacaine in subarachnoid block in terms of

- Onset and duration of sensory and motor block.
- Intraoperative and postoperative haemodynamic profile.

REVIEW OF LITERATURE

Spinal anaesthesia was performed in humans for the first time by August Bier in 1989 using cocaine. Subsequently, many other local anaesthetics like procaine, tetracaine, lidocaine, ropivacaine and bupivacaine were studied for spinal anaesthesia and were compared in terms of quality of block, haemodynamics and duration of post-operative analgesia. Bupivacaine is an amide local anaesthetic agent which has many limitations if used alone. As a sole agent, it is required in higher doses which can lead to CVS and CNS side effects which include myocardial dysfunction, loss of peripheral vascular tone, arrhythmias, QT prolongation, cardiac arrest, seizures, visual disturbances, respiratory depression and coma. Thus, in order to overcome these limitations, various adjuvants are added to local anaesthetics. These adjuvants help prolong the anaesthesia along with reduction of dose of the local anaesthetic required for the block. By overcoming the deleterious effects of local anaesthetics by reducing their doses required, spinal adjuvants provide an advantage over local anaesthetics being used alone. They potentiate the analgesic effect of local anaesthetics.

Opioids are the most frequently used spinal additives to local anaesthetics. Karaman S et al showed that addition of opioids to local anaesthetics provided safe and effective spinal anaesthesia. Opioids act in three ways. They cause direct spinal cord dorsal horn opioid receptor activation. After CSF transport, they cause cerebral opioid receptor activation. Lastly, they cause systemic effects after vascular absorption.[10] Liu S et al performed a randomized, balanced, double blind study to observe the effect of addition of fentanyl to intrathecal lignocaine. They observed that the duration of surgical anaesthesia was increased by addition of fentanyl. They also observed that fentanyl increased the tourniquet time. Fentanyl provided all these benefits without delaying recovery of motor function and micturation in the study.[11]

Prabhakaraiah UN et al performed a comparative study of fentanyl and nalbuphine as adjuvants to intrathecal bupivacaine in lower abdominal surgeries. They observed that addition of fentanyl led to lower VAS scores postoperatively. They also showed that opioid adjuvants did not have any sympatholytic activity but rather enhanced the antinociception in the spinal cord.[12] S Gauchan et al studied the effect of addition of fentanyl to intrathecal plain hyperbaric bupivacaine in elective cesarean sections and found that the group receiving fentanyl with bupivacaine had prolonged duration of sensory block and analgesia as compaired to group receiving plain bupivacaine.[13] Bano F et al observed similar results in their study while comparing plain bupivacaine with combined bupivacaine and fentanyl groups in cesarean sections.[14]

A lot of side effects are associated with use of intrathecal opioids like nausea, vomiting, pruritis, urinary retention and respiratory depression.[15] Ali MA et al did a randomized controlled trial to study the effects of varying doses of intrathecal fentanyl and observed that when fentanyl is used intrathecally in the dose of 25 µg, it causes a high incidence of pruritis, nausea and dizziness.[16] Varrassi G et al showed that intrathecal fentanyl caused respiratory depression when added in higher doses in the elderly.[17] Liu S et al also observed pruritis in their subjects on addition of fentanyl intrathecally.[11] Wong CA et al carried out a double blind and randomized controlled study to find out optimal dose of intrathecal fentanyl with 2.5 mg bupivacaine for initiation of labour analgesia. 6 groups received doses of 0, 5, 10, 15, 20 and 25 mcg of fentanyl. The authors concluded that the duration of analgesia was shorter for 0, 5 and 10 mcg group as compared to 15, 20 and 25 mcg group. There was difference in the incidence of nausea and vomiting and the incidence of pruritis was greater in all the groups receiving fentanyl.[18]

Many studies have been done comparing opioids and non opioids as adjuvants to intrathecal local anaesthetics in terms of onset and duration

of sensory and motor block and haemodynamic profile. Katiyar S et al compared fentanyl and different doses of magnesium sulphate as additives to bupivacaine in infraumbilical surgeries under subarachnoid block.[19] They compared 4 groups of bupivacaine with normal saline, bupivacaine with 25 mcg fentanyl, bupivacine with 50mg magnesium and bupivacaine with 100mg magnesium. They observed a delayed onset of motor block in both magnesium sulphate groups which could be due to difference in baricity and pH of solution containing magnesium sulphate[20,21] and due to activation of cytochrome p450 by magnesium leading to increased metabolism of bupivacaine.[22,23] Khezri MB et al demonstrated a delay in onset of sensory and motor block while using intrathecal magnesium sulphate.[24,25] Unlugenc H et al compared magnesium sulphate, fentanyl and placebo as adjuvants to intrathecal bupivacaine in parturients undergoing cesarean sections and concluded that onset of sensory block was faster and duration of sensory and motor blocks was longer in fentanyl group as compared to magnesium and placebo groups.[26]

Khadke SJ et al carried a randomized and double blind study to investigate the effect of adding neostigmine and magnesium sulphate to 0.5% hyperbaric bupivacaine. They concluded that neostigmine and magnesium did not affect characteristics of spinal anaesthesia but the incidence of bradycardia and atropine requirement was lower in patients receiving magnesium as an adjuvant.[27,28] Mohamed KS et al did a study to find the effectiveness of intrathecal magnesium sulphate as an adjuvant to bupivacaine on surgeon satisfaction and postoperative analgesia in laproscopic gynaecological surgeries.[29] They studied 60 patients. 30 of them received only bupivacaine and the rest 30 received 50 mg magnesium sulphate in addition to bupivacaine for subarachnoid block. They concluded that addition of 50 mg of magnesium sulphate to bupivacaine led to decreased analgesic requirement in the post operative

period. Also, period of post operative pain relief was longer in the group receiving magnesium sulphate with bupivacaine.[30-33]

Yadav M et al carried out a study in which they compared 4 groups for infraumbilical surgeries which received 0.5% bupivacaine + 0.5 mL normal saline, 0.5% bupivacaine + 25 µg fentanyl, 0.5% bupivacaine + 50 mg magnesium and 0.5% bupivacaine + 100 mg magnesium sulphate respectively. All 4 groups received equal volumes of intrathecal drugs. The mean duration of analgesia in the 4 groups was 272.8, 360, 252.5 and 276.6 min respectively. So they concluded that addition of 100 mg magnesium sulphate is as effective as fentanyl in terms of duration of analgesia.[34-37] Khalili G et al performed a double blind randomized controlled trial undergoing lower limb orthopaedic surgeries. The patients were randomly allocated to receive 100 mg magnesium sulphate (0.2 mL) with 15 mg of 0.5% bupivacaine or 0.2 mL of saline combined with 15 mg of 0.5% bupivacaine intrathecally. They concluded that addition of 100 mg of magnesium sulphate intrathecally to 15 mg of bupivacaine without opioid supplementation, prolonged the duration of sensory block and decreased postoperative analgesic consumption.[38-41]

MATERIAL & METHODS

SOURCE OF DATA

After acceptance by the ethical committee, this study was conducted in the Department of Anaesthesiology DMCH, Ludhiana. Patients of ASA grade l and ll, aged 18-70 years of either sex posted for elective lower limb surgeries were considered for the study. A total of 100 patients were randomly allocated into either of the two study groups of 50 patients each by computer generated randomization codes contained in sealed, sequentially numbered envelopes. A written informed consent was obtained from each patient prior to the procedure.

INCLUSION CRITERIA-

- ASA I and II
- Age 18-70 years

EXCLUSION CRITERIA-

- Patients not giving consent for subarachnoid block.
- Patients with deformities of spine i.e. scoliosis and kyphoscoliosis.
- Patients with deranged coagulation profile or pre existing bleeding disorders.
- Infection at the site of block.
- Patients who were allergic to the drugs being used.
- Patients with pre existing severe cardiovascular diseases (like ischemic heart disease, heart failure, ventricular hypertrophy, coronary artery disease etc.), neurological or hepatorenal diseases.
- Patients in whom mode of anaesthesia was converted to general anaesthesia.

GROUP ALLOCATION: The selected patients were divided into 2 groups based on table of random numbers.

Group 1 - Patients in this group received 2.5 mL of 0.5% hyperbaric bupivacaine (12.5 mg) + 0.5 mL of fentanyl (25 µg) to make a total volume of 3 mL.

Group 2 - Patients in this group received 2.5 mL of 0.5% hyperbaric bupivacaine (12.5mg) + 0.2 mL of magnesium sulphate (100 mg) with 0.3 mL of distilled water to make total volume of 3 mL.

PREANAESTHETIC CHECK UP

All the patients underwent a preanaesthetic checkup which included a detailed history, general physical examination, systemic examination and routine investigations (complete haemogram, PT-INR, renal function test, serum electrolytes, chest x-ray and electrocardiogram).

The patients were kept nil per oral for atleast 8 hours before surgery.

PRE MEDICATION: Tablet ranitidine 150 mg and tablet alprazolam 0.25 mg were given at night and at 6 am on the morning of surgery.

On the day of surgery, after a pre operative evaluation and measurement of vitals i.e. heart rate (HR), blood pressure (BP), oxygen saturation (SpO_2), patients were shifted to the operation theatre.

ANAESTHESIA TECHNIQUE

Intravenous line was secured and isotonic crystalloid drip was started. Monitors were attached to the patient to record HR, BP and SpO_2. ECG was applied to the patient. Under all aseptic conditions, L3-L4 or L4-L5 vertebral interspace was palpated with patient in sitting position. 2mL of 2% lignocaine was locally infilterated in the area of palpated space. A Quincke's needle of 26 gauge was then inserted in the subarachnoid space and after confirmation of free flow of CSF, the drug mixture was given in the space.

The drug mixture to be given was decided by choosing a coded envelope. The envelope was opened by the anaesthesiologist not involved in the study who prepared the drug mixture and handed it over to the anaesthesiologist performing the SAB. After administration of the drug in the subarachnoid space, patient was made to lie in supine position. Onset and duration of sensory and motor block and the intraoperative haemodynamic profile were monitored by the attending anaesthesiologist during the surgery who was blinded to the drug mixture delivered. After

the surgery, patient was shifted to the recovery room. The drug mixture given was decoded after completion of the study.

OBSERVATION

Onset of sensory block was assessed by pinprick and was taken as the point of time at which patient was unable to feel the pinprick at the level of T8. Duration of sensory block was taken as time of regression of two segments in maximum block height. Onset of motor block was taken as time to attain modified bromage score of 3 after the injection of drug mixture and the surgery was allowed to start. Duration of motor block was taken as the time from onset of motor block till the attainment of modified bromage score of 0.

MODIFIED BROMAGE SCORE

0- free movement of legs and feet

1- Unable to raise extended legs but able to flex knees with free movement of feet.

2- Unable to flex knees but with free movement of feet.

3- Unable to move legs and feet

INTRAOPERATIVE ASSESSMENT

The sensory block was recorded at 0, 5, 10 and 15 mins after intrathecal injection and subsequently every 15 mins. The highest level of sensory block was recorded by pinprick at mid clavicular line anteriorly every 5 minutes for the first 15 minutes and then every 15 minutes till 90 mins.

Motor block was also recorded at 0, 5, 10 and 15 mins and then every 15 minutes till 90 mins.

Haemodynamic parameters i.e. HR, SBP, DBP, MAP and SpO_2 of the patient were recorded at 0, 5, 10, 15 mins in the intraoperative period after intrathecal injection and then every 15 mins till 90 mins. Fall in SBP by more than 20% below the pre-anaesthetic levels was treated with intermittent boluses of i.v. ephedrine 3mg. Fall in HR below 20% of baseline was treated with 0.6mg of i.v. atropine.

POSTOPERATIVE ASSESSMENT

Immediately after shifting the patient to recovery room, HR, SBP, DBP, MAP, respiratory rate (RR) and SpO_2 were recorded every 15 mins for the first 60 mins and then hourly till 6 hours.

Quality of post operative analgesia was assessed using Visual analogue scale (VAS) (which range from 0 indicating no pain till 10 indicating severe intolerable pain) which was explained preoperatively to the patient.VAS score was recorded at 0, 2, 4 and 6 hours postoperatively. Patient complaining of pain with VAS score of 4 or more was given injection tramadol (50 mg) intravenously slowly.

Postoperatively, sensory and motor block level were recorded every 15 mins till 60 mins, half hourly till the third hour and then hourly till the end of 6 hours.

Patient was sent from the recovery room to the ward after complete resolution of the motor block and attainment of modified aldrete score of 9 or more.

Sample size-

A post hoc power analysis was conducted using the software package, G*Power (Faul and Erdfelder 1992).The alpha level used for this analysis was $p < 0.05$ and beta was 0.20. The post hoc analyses revealed the statistical power of 0.40 for this study for detecting a small effect, whereas the power exceeded 0.99 for the detection of a moderate to large effect size. Thus, there was more than adequate power (i.e., power > 0.80) at the moderate to large effect size level, but less than adequate statistical power at the small effect size level. By using the study done by Katiyar S et al[19] as a template and using the Time for Full Recovery of Motor Function as a parameter and expecting similar results, power came out to be 0.86 with 10% chance of error and a sample size of 50 each for two groups was calculated with a total sample size of 100.

OUTCOME:

PRIMARY OUTCOME:

- Onset and duration of sensory and motor block.
- Haemodynamic parameters i.e. Heart Rate (HR), Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Mean arterial pressure (MAP), Peripheral Oxygen Saturation (SpO_2) and Respiratory Rate (RR).

SECONDARY OUTCOME:

- Postoperative VAS score at 2^{nd}, 4^{th} and 6^{th} hour.

STATISTICAL ANALYSIS

Data was described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. Comparison of quantitative variables between the study groups was done using Student t-test and Mann Whitney U test for independent samples for parametric and non-parametric data respectively. For comparing categorical data, Chi square ($\chi 2$) test was performed and exact test was used when the expected frequency was less than 5. A probability value (p value) less than 0.05 was considered statistically significant. All statistical calculations were done using SPSS (Statistical Package for the Social Science) 21 version statistical program for Microsoft Windows.

OBSERVATION & RESULTS

The study was conducted in the Department of Anaesthesiology, Dayanand Medical College and Hospital, Ludhiana. 100 patients undergoing orthopaedic lower limb surgeries were studied with the aim of comparing fentanyl and magnesium sulphate as adjuvants to bupivacaine in terms of onset and duration of motor and sensory block and intraopertive and postoperative haemodynamic parameters

DEMOGRAPHIC PROFILE

Table 1- Age distribution of patients in both groups (in years)

	Group 1		Group 2		T	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
Age	37.30	14.00	37.20	14.38	0.035	0.972	-5.53	5.73

The mean age of patients in both groups was comparable and the difference was statistically insignificant (p > 0.05).

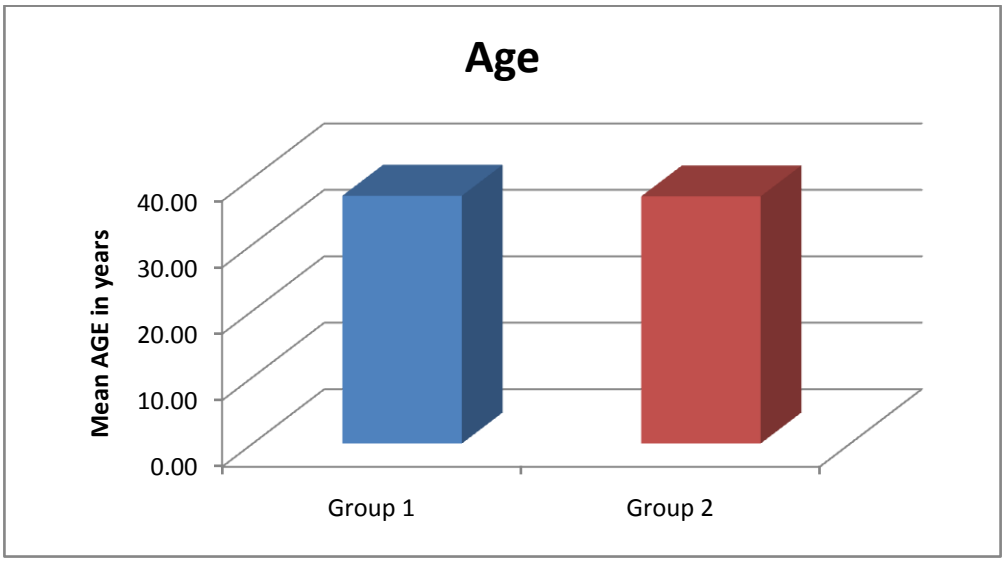

Figure 1- Age distribution of patients in both groups (in years)

Table 2- Sex distribution in both groups

		Treatment Group				Total	Chi-square value	p-value
			Group 1		Group 2			
Sex	F	8	16%	11	22%	19	0.585	0.444
	M	42	84%	39	78%	81		
Total		50	100%	50	100%	100		

Majority of patients in our study were males. The distribution of patients to both sexes was comparable in the groups with a p value of more than 0.05 i.e. statistically insignificant.

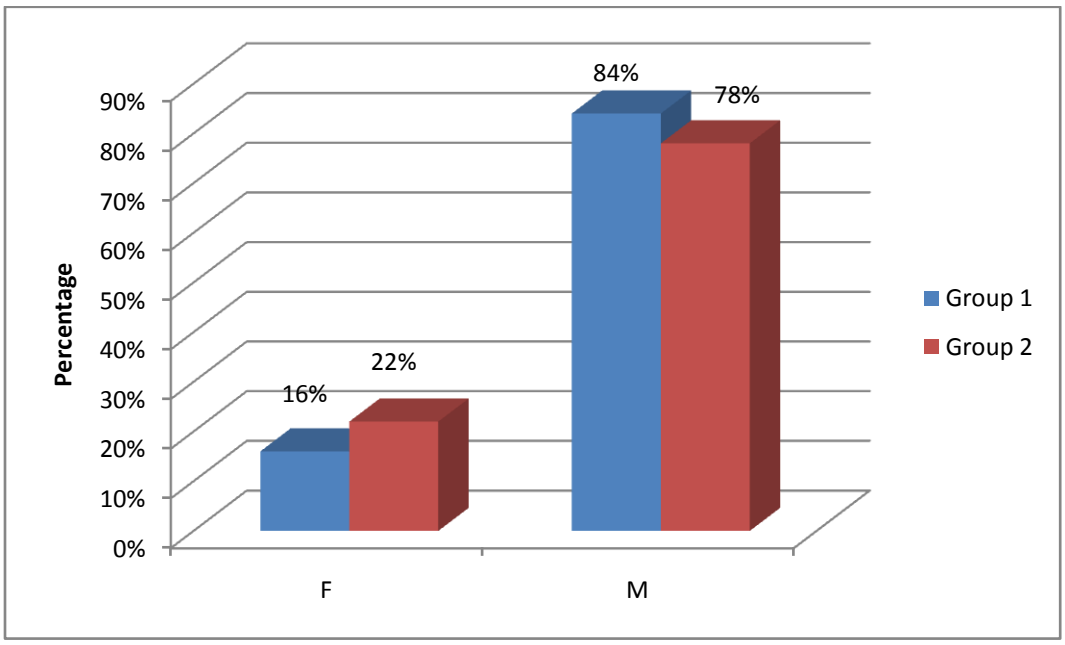

Figure 2- Sex distribution in both groups

Table 3- BMI of patients in both groups (in Kg/m^2)

	Group 1		Group 2		T	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
BMI	24.63	2.55	24.42	3.73	0.326	0.745	-1.06	1.48

The mean BMI of patients in group 1 was 24.63 ± 2.55 and in group 2 was 24.42 ± 3.73. Both groups were comparable in terms of BMI (p > 0.05).

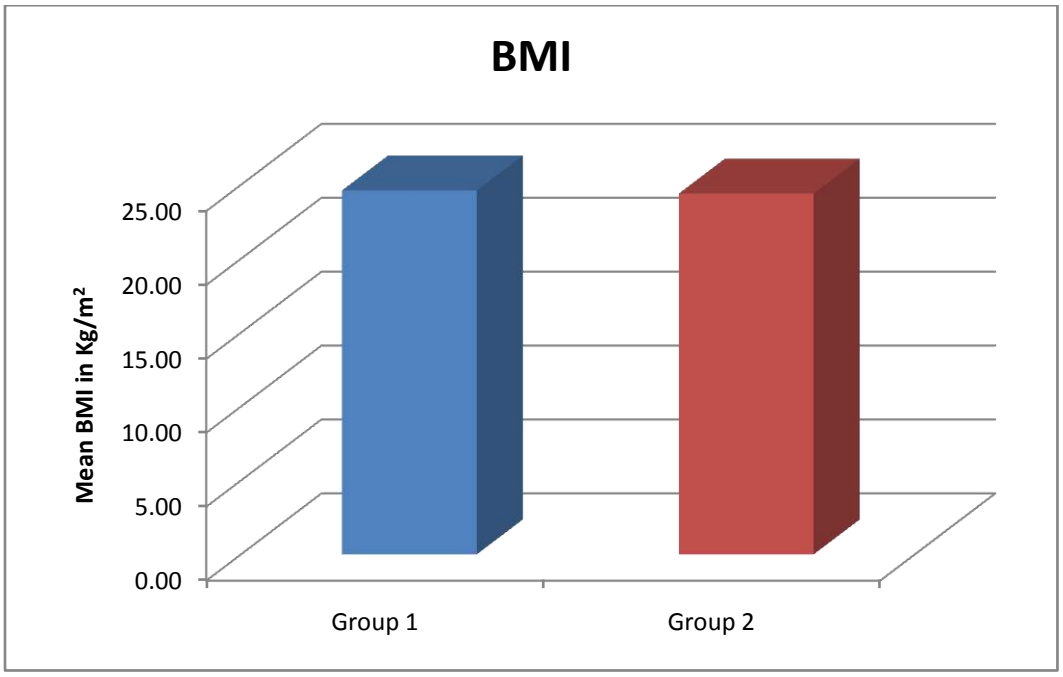

Figure 3- BMI of patients in both groups (in Kg/m^2)

Table 4- Distribution of patients according to ASA physical status

		Treatment Group				Total	Chi-square value	p-value
		1		2				
ASA Grade	I	39	78%	38	76%	77	0.056	0.812
	II	11	22%	12	24%	23		
Total		50	100%	50	100%	100		

Most of the patients in both fentanyl (78%) and magnesium sulphate (76%) belonged to ASA grade I. The 2 groups were comparable in terms of ASA grading ($p > 0.05$).

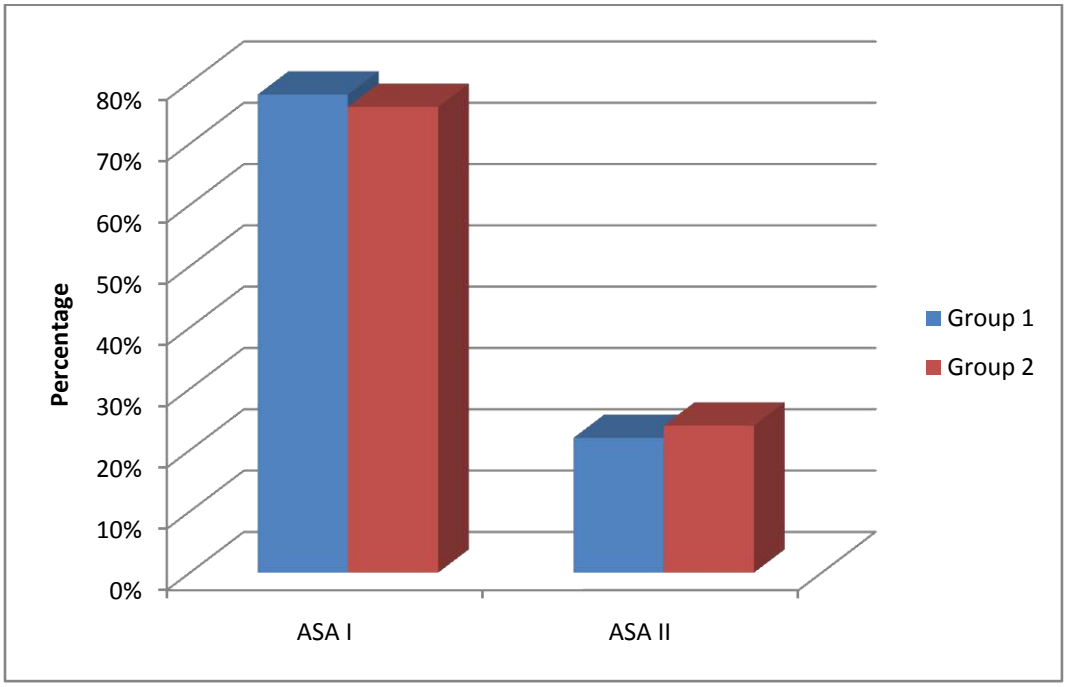

Figure 4. Distribution of patients according to ASA physical status

Table 5 – Mean time of onset of sensory and motor block (in minutes)

	Group 1		Group 2		Z	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
Time of onset of sensory block	7.52	4.90	10.80	6.93	-2.722	0.006	0.00	0.03
Time To attain Max. Motor Block	6.36	3.84	9.68	6.15	-3.187	0.001	0.00	0.03

The mean time of onset of sensory block was 7.52 ± 4.90 min in fentanyl group and 10.80 ± 6.93 min in magnesium sulphate group. Thus, the onset was faster in fentanyl group and the difference was statistically significant with a p value of 0.006.

Mean time to attain a bromage score of 3 was 6.36 ± 3.84 min in fentanyl group and 9.68 ± 6.15 min in magnesium sulphate group. Thus, the time of onset of motor block was faster in fentanyl group as compared to magnesium group and the difference was statistically significant with a p value of 0.001.

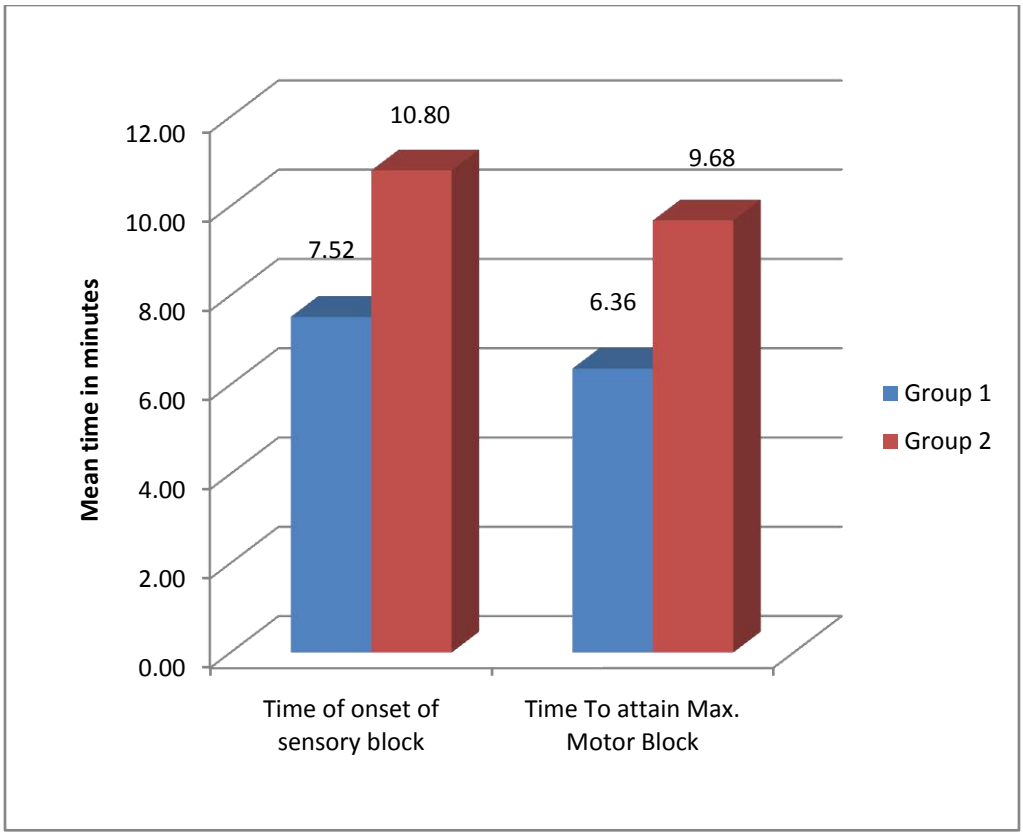

Figure 5 – Mean time of onset of sensory and motor block (in minutes)

Table 6- Highest level of sensory block reached in both groups

		Treatment Group				Total	Chi-square value	p-value
		1		2				
Max. Level Of Sensory Block	T4	20	40%	12	24%	32	2.940	0.086
	T6	20	40%	21	42%	41	0.291	0.589
	T8	10	20%	17	34%	27	2.486	0.115
Total		50	100%	50	100%	100	3.839	0.147

The highest level of sensory block in group 1 was T4, T6 and T8 in 40%, 40% and 20% patients respectively. In group 2, the highest level was T4 in 24%, T6 in 42 % and T8 in 34 % patients. Therefore, the highest level of sensory block attained was comparable in both the groups with a p value of more than 0.05.

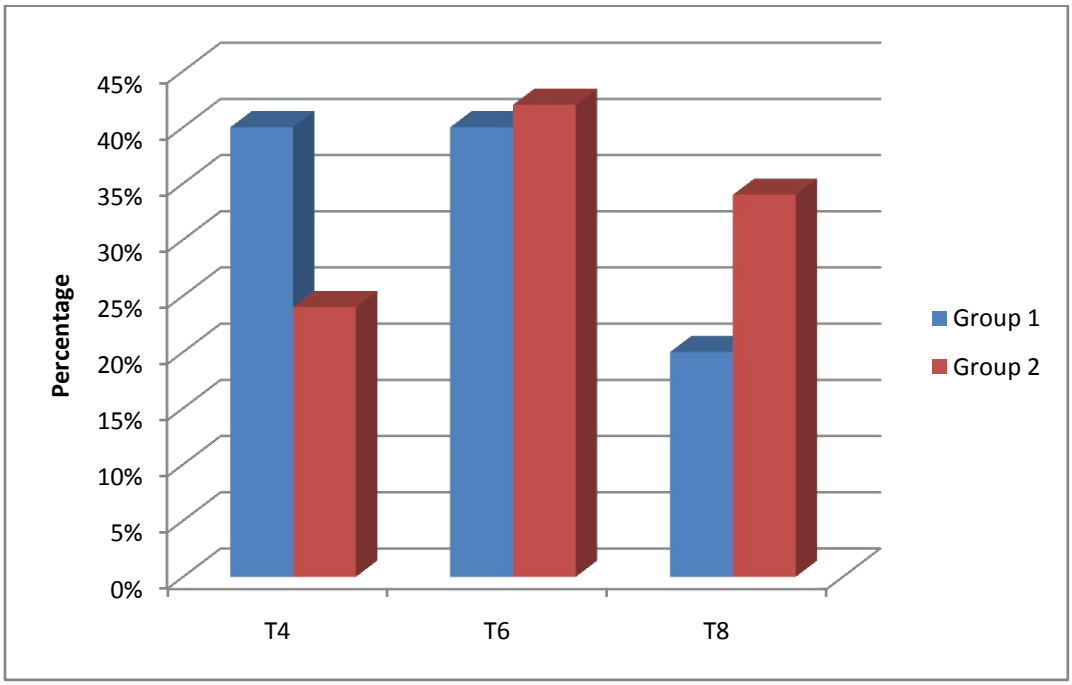

Figure 6- Highest level of sensory block reached in both groups

Table 7- Mean time to reach highest level of sensory block (in minutes)

	Group 1		Group 2		Z	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
Time to attain max level of sensory block	16.34	8.57	18.52	9.12	-1.058	0.290	0.26	0.44

The time to reach highest level of sensory block was comparable in both the groups. It was 16.34 ± 8.57 min in group 1 and 18.52 ± 9.12 min in group 2. The difference was statistically insignificant (p = 0.29).

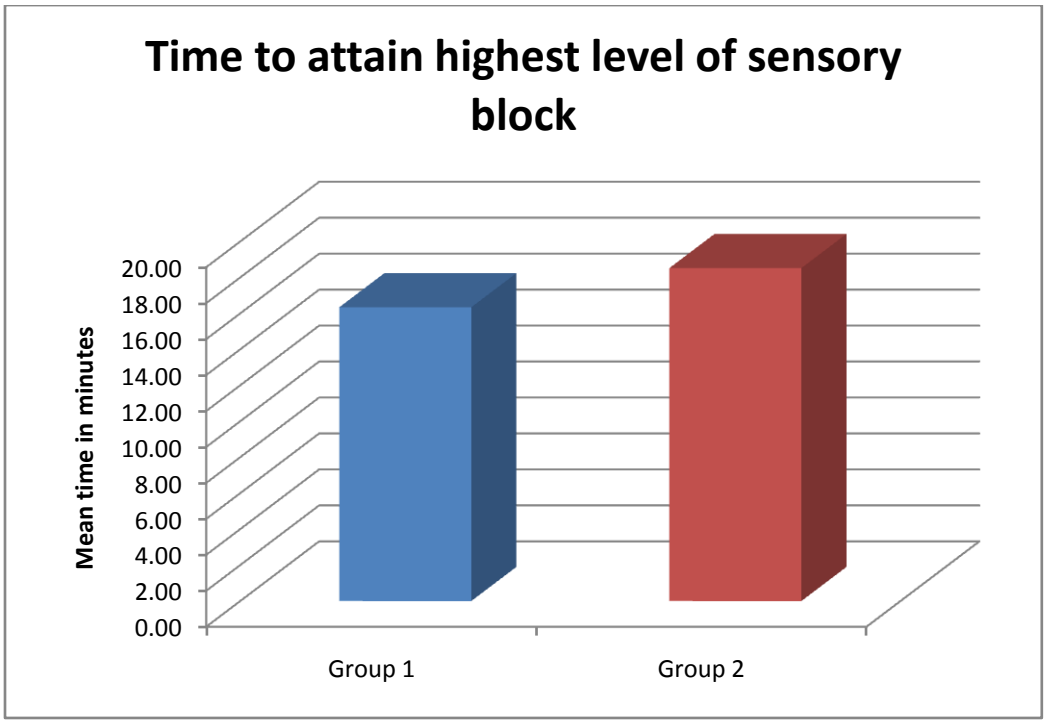

Figure 7- Mean time to reach highest level of sensory block (in minutes)

Table 8– Mean duration of sensory and motor block (in minutes)

	Group 1		Group 2		Z	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
Time of 2 segment regression from max block ht (Duration of sensory block)	57.48	20.86	62.50	20.58	-1.393	0.163	0.10	0.26
Time Until Full Recovery Of Motor Function (Duration of motor block)	143.04	38.92	137.62	45.17	-0.724	0.469	0.34	0.54

Mean duration of sensory block was longer in group 2 (62.5 ± 20.58 min) than group 1 (57.48 ± 20.86 min) but the difference was statistically insignificant ($p > 0.05$).

Mean duration of motor block was 143.04 ± 38.92 min in group 1 and 137.62 ± 45.17 min in group 2 but the difference was statistically insignificant ($p > 0.05$).

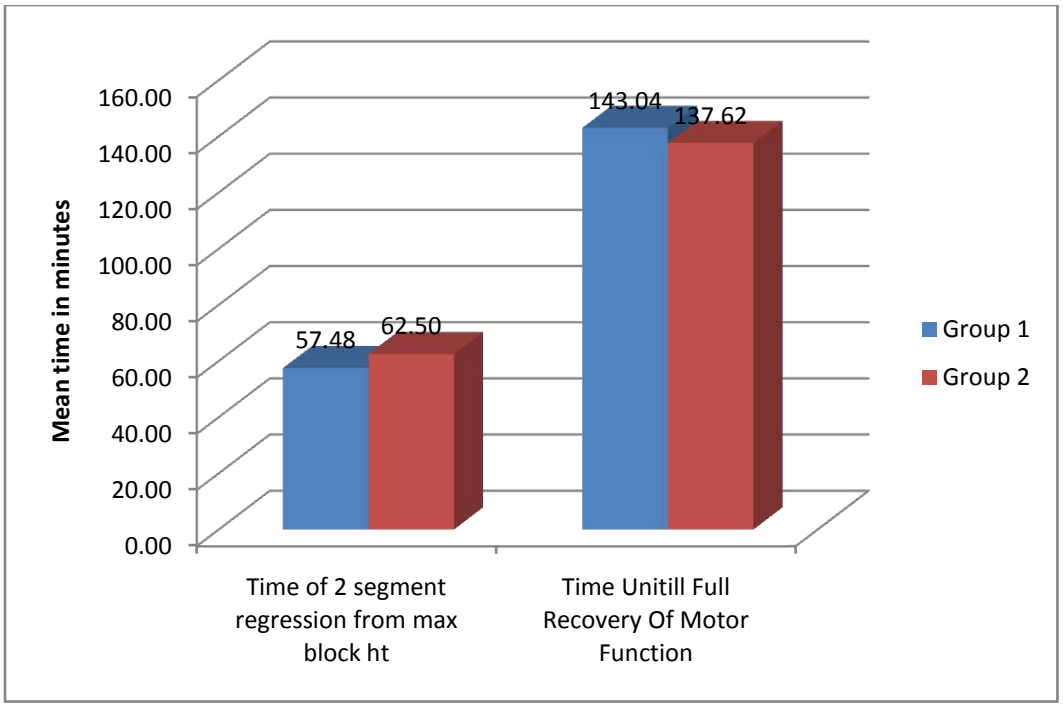

Figure 8 – Mean duration of sensory and motor block (in minutes)

Table 9- Intraoperative heart rate trend in both groups (per Min)

	Group 1		Group 2		t	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
HR_0 Mins	87.78	18.13	87.62	14.88	0.048	0.962	-6.42	6.74
HR_5 Mins	81.14	18.41	85.00	17.47	-1.075	0.285	-10.98	3.26
HR_10 Mins	77.26	17.63	80.92	17.78	-1.034	0.304	-10.69	3.37
HR_15 Mins	76.52	15.65	81.46	16.50	-1.536	0.128	-11.32	1.44
HR_30 Mins	77.06	14.92	79.98	14.50	-0.993	0.323	-8.76	2.92
HR_45 Mins	78.22	14.82	80.26	14.12	-0.705	0.483	-7.79	3.71
HR_60 Mins	78.76	13.94	80.40	13.22	-0.604	0.547	-7.03	3.75
HR_75 Mins	78.64	14.32	81.10	12.73	-0.908	0.366	-7.84	2.92
HR_90 Mins	79.40	12.72	81.44	11.23	-0.850	0.397	-6.80	2.72

Baseline heart rates of both the groups was comparable (87.78 ± 18.13 per min in group 1 and 87.62 ± 14.88 per min in group 2). The intraoperative fall in heart rate was also comparable in both the groups ($p > 0.05$). Intraoperative bradycardia was seen in 44 % patients of group 1 and 38 % patients in group 2. Therefore, the incidence of bradycardia was comparable in both the groups ($p > 0.05$).

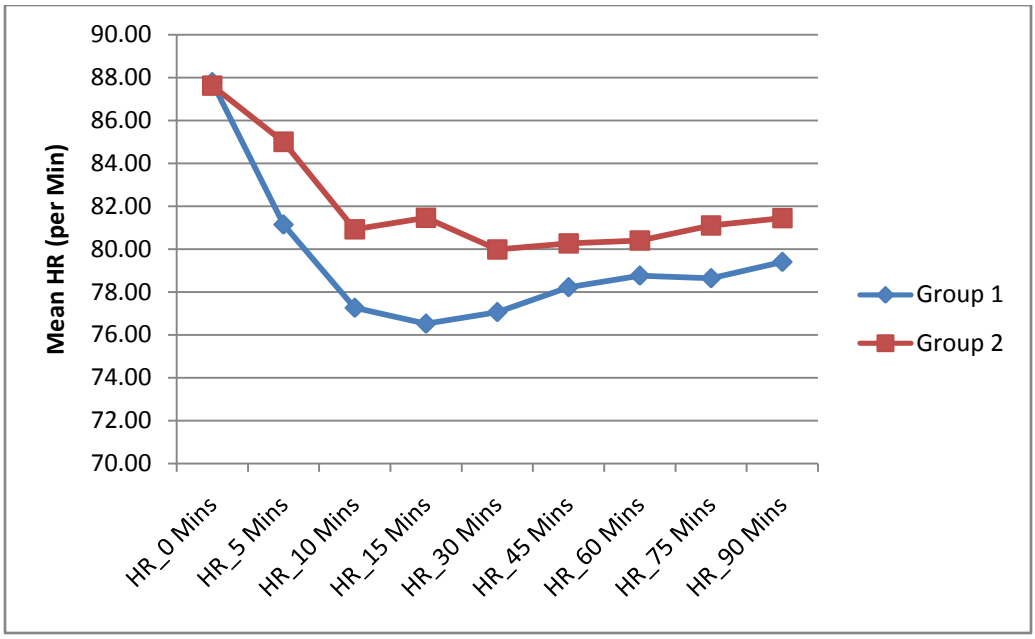

Figure 9- Intraoperative heart rate trend in both groups (per Min)

Table 10 – Intraoperative systolic blood pressure (SBP) trend in both groups (in mmHg)

	Group 1		Group 2		t	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
SBP_0 Mins	130.96	9.13	130.12	9.83	0.443	0.659	-2.92	4.60
SBP_5 Mins	116.32	16.97	118.16	14.57	-0.582	0.562	-8.12	4.44
SBP_10 Mins	111.22	17.82	112.76	13.97	-0.481	0.632	-7.90	4.82
SBP_15 Mins	115.48	13.35	115.56	11.37	-0.032	0.974	-5.00	4.84
SBP_30 Mins	118.44	11.42	116.20	12.07	0.953	0.343	-2.42	6.90
SBP_45 Mins	119.98	10.96	118.62	10.84	0.624	0.534	-2.97	5.69
SBP_60 Mins	122.42	10.52	119.28	11.19	1.446	0.151	-1.17	7.45
SBP_75 Mins	124.30	9.49	120.96	10.30	1.686	0.095	-0.59	7.27
SBP_90 Mins	126.04	8.09	122.82	9.49	1.826	0.071	-0.28	6.72

Baseline SBP was 130.96 ± 9.13 mmHg in group 1 and 130.12 ± 9.83 mmHg in group 2. There was no statistically significant difference in baseline SBP as well as SBP at all times intraoperatively in both the groups ($p > 0.05$).

50 % of patients in group 1 and 54 % patients in group 2 had intraoperative hypotension i.e. more than 20 % fall from baseline SBP. The difference in incidence of hypotension among the 2 groups was statistically insignificant ($p > 0.05$).

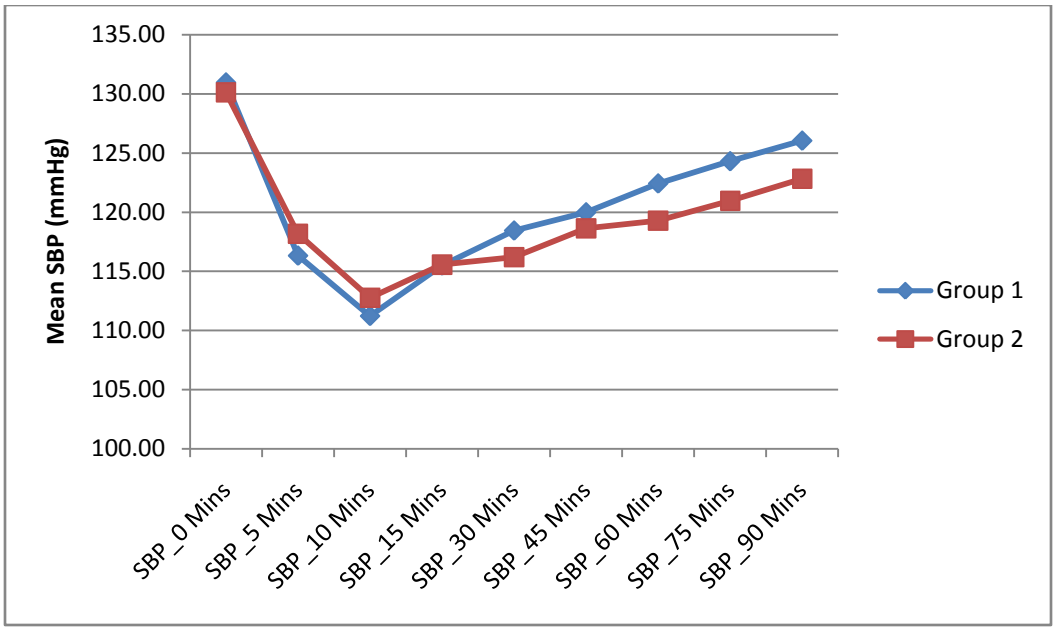

Figure 10– Intraoperative systolic blood pressure (SBP) trend in both groups (in mmHg)

Table 11- Intraoperative diastolic blood pressure (DBP) trend in both the groups (in mmHg)

	Group 1		Group 2		t	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
DBP_0 Mins	79.60	8.19	80.40	8.47	-0.480	0.632	-4.11	2.51
DBP_5 Mins	70.32	10.47	70.18	10.78	0.066	0.948	-4.08	4.36
DBP_10 Mins	64.84	14.06	64.44	10.37	0.162	0.872	-4.50	5.30
DBP_15 Mins	68.92	11.04	67.92	8.96	0.497	0.620	-2.99	4.99
DBP_30 Mins	70.96	9.56	68.78	8.01	1.236	0.219	-1.32	5.68
DBP_45 Mins	70.88	8.73	69.88	8.38	0.584	0.560	-2.40	4.40
DBP_60 Mins	73.04	8.53	71.82	9.72	0.667	0.506	-2.41	4.85
DBP_75 Mins	73.36	7.79	72.78	8.34	0.359	0.720	-2.62	3.78
DBP_90 Mins	75.24	7.98	73.78	6.81	0.984	0.328	-1.48	4.40

The DBP of both the groups was comparable at baseline and at all times intraoperatively ($p > 0.05$).

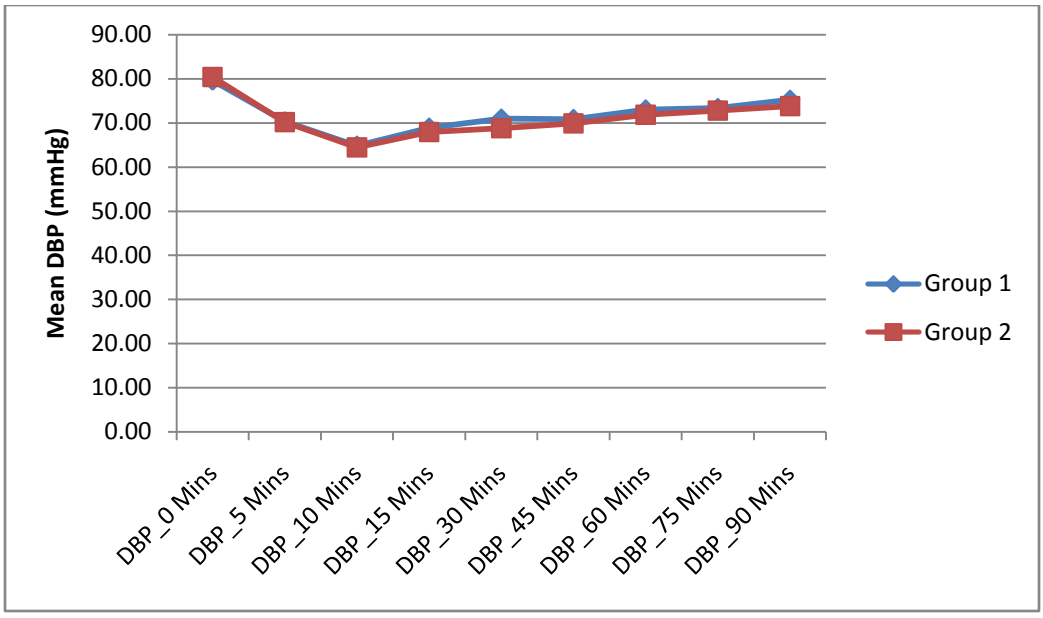

Figure 11- Intraoperative diastolic blood pressure (DBP) trend in both the groups (in mmHg)

Table 12- Intraoperative mean arterial pressure (MAP) trend in both groups (in mmHg)

	Group 1		Group 2		t	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
MAP_0 Mins	97.44	8.12	97.34	8.38	0.061	0.952	-3.18	3.38
MAP_5 Mins	85.90	12.25	87.16	11.42	-0.532	0.596	-5.96	3.44
MAP_10 Mins	81.54	14.85	80.86	10.53	0.264	0.792	-4.43	5.79
MAP_15 Mins	85.02	11.80	84.26	8.63	0.368	0.714	-3.34	4.86
MAP_30 Mins	87.70	10.16	85.56	8.54	1.140	0.257	-1.59	5.87
MAP_45 Mins	87.90	8.89	87.48	8.40	0.243	0.809	-3.01	3.85
MAP_60 Mins	89.80	9.53	88.76	9.64	0.543	0.589	-2.76	4.84
MAP_75 Mins	90.82	7.90	89.70	8.00	0.704	0.483	-2.04	4.28
MAP_90 Mins	92.78	7.64	90.50	6.41	1.616	0.109	-0.52	5.08

The MAP was comparable in both the groups at baseline. It was 97.44 ± 8.12 mmHg in group 1 and 97.34 ± 8.38 mmHg. The MAP at all times intraoperatively was comparable in both the groups ($p > 0.05$).

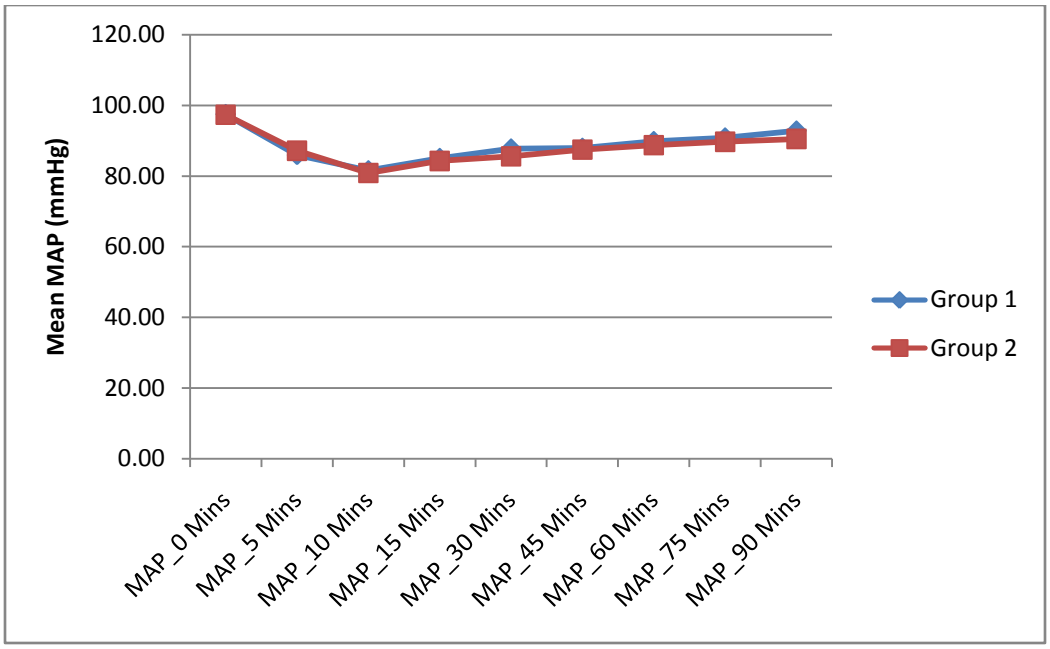

Figure 12- Intraoperative mean arterial pressure (MAP) trend in both groups (in mmHg)

Table 13- Postoperative heart rate trend in both the groups (per Min)

	Group 1		Group 2		t	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
POST OP HR_0 Mins	79.40	12.72	81.28	11.33	-0.780	0.437	-6.66	2.90
POST OP HR_15 Mins	79.78	12.81	81.18	11.11	-0.584	0.561	-6.16	3.36
POST OP HR_30 Mins	81.46	13.03	81.22	10.91	0.100	0.921	-4.53	5.01
POST OP HR_45 Mins	82.74	12.07	81.54	11.23	0.515	0.608	-3.43	5.83
POST OP HR_60 Mins	82.56	11.75	81.44	11.41	0.484	0.630	-3.48	5.72
POST OP HR_2 Hrs	81.96	11.84	80.88	11.22	0.468	0.641	-3.50	5.66
POST OP HR_3 Hrs	81.64	10.56	80.96	11.24	0.312	0.756	-3.65	5.01
POST OP HR_4 Hrs	81.58	11.31	80.96	10.40	0.285	0.776	-3.69	4.93
POST OP HR_5 Hrs	81.60	11.06	80.76	10.04	0.398	0.692	-3.35	5.03
POST OP HR_6 Hrs	82.56	10.93	80.48	9.80	1.002	0.319	-2.04	6.20

Heart rate was comparable in both the groups at all times postoperatively ($p > 0.05$).

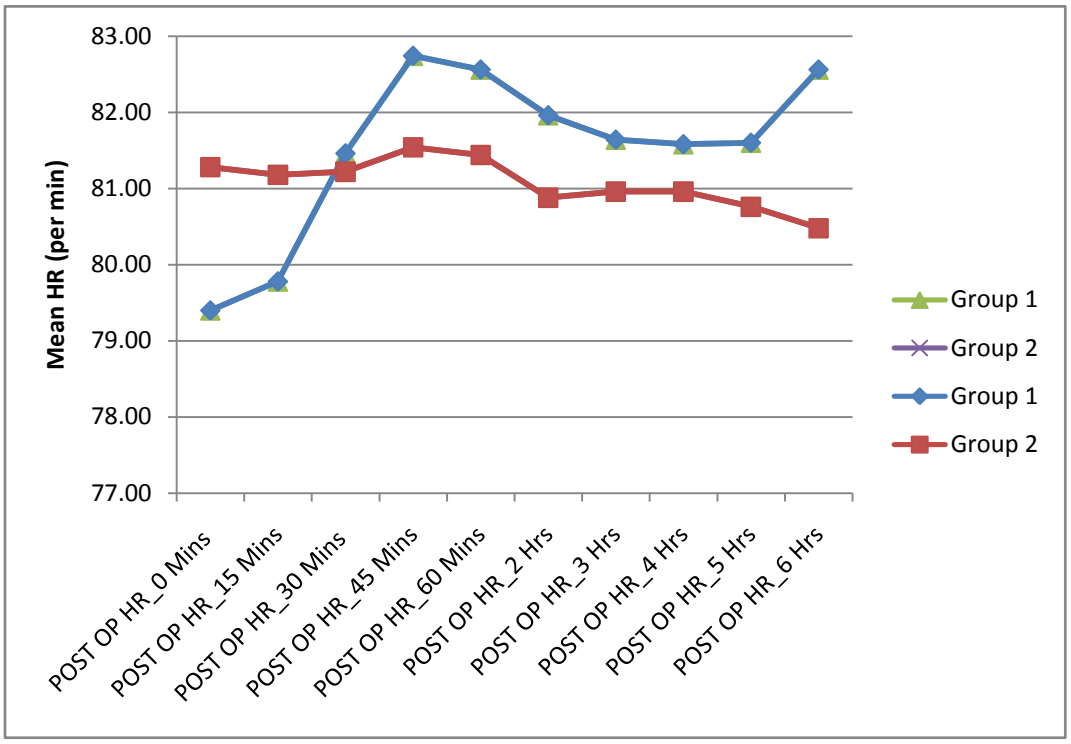

Figure 13- Postoperative heart rate trend in both the groups (per Min)

Table 14- Postoperative Systolic blood pressure (SBP) trend in both groups (in mmHg)

	Group 1		Group 2		t	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
POST OP SBP_0 Mins	126.04	8.09	123.48	9.66	1.437	0.154	-0.98	6.10
POST OP SBP_15 Mins	126.08	8.63	123.12	9.01	1.678	0.097	-0.54	6.46
POST OP SBP_30 Mins	127.40	6.44	124.96	9.51	1.502	0.136	-0.78	5.66
POST OP SBP_45 Mins	128.24	8.20	125.24	9.65	1.675	0.097	-0.55	6.55
POST OP SBP_60 Mins	127.72	10.46	125.44	9.28	1.153	0.252	-1.65	6.21
POST OP SBP_2 Hrs	127.08	8.81	125.24	9.12	1.026	0.307	-1.72	5.40
POST OP SBP_3 Hrs	128.08	8.58	125.32	7.77	1.686	0.095	-0.49	6.01
POST OP SBP_4 Hrs	127.94	7.94	125.44	8.76	1.495	0.138	-0.82	5.82
POST OP SBP_5 Hrs	128.56	6.30	126.28	8.32	1.545	0.126	-0.65	5.21
POST OP SBP_6 Hrs	127.16	6.88	126.92	8.37	0.157	0.876	-2.80	3.28

The SBP was comparable in both the groups at all times postoperatively with no statistically significant difference ($p > 0.05$).

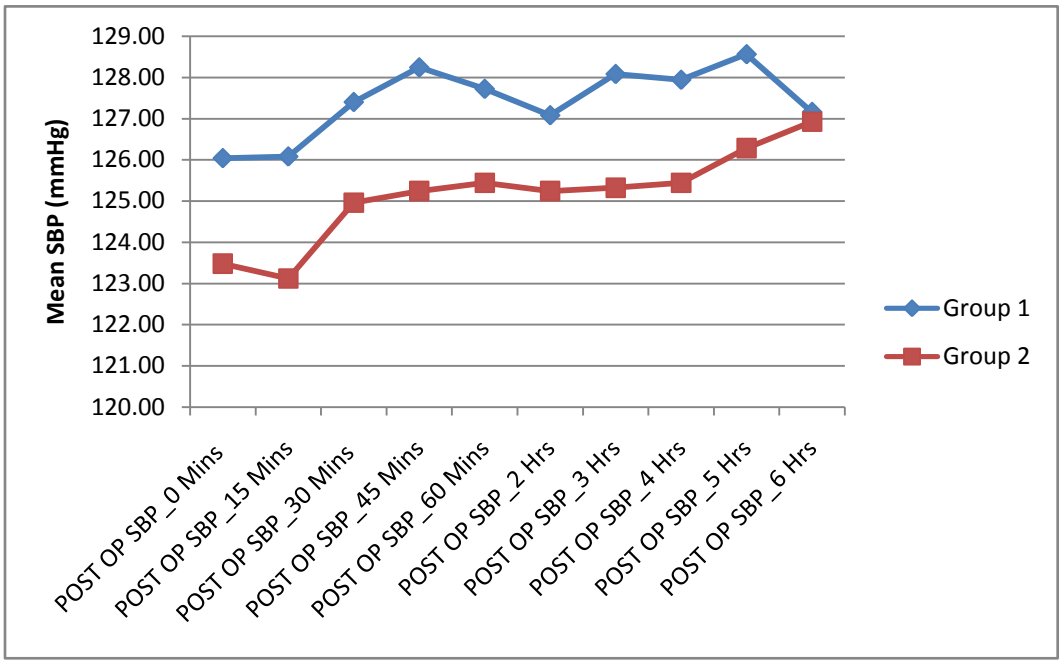

Figure 14- Postoperative Systolic blood pressure (SBP) trend in both groups (in mmHg)

Table 15- Postoperative diastolic blood pressure (DBP) trend in both groups (in mmHg)

	Group 1		Group 2		t	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
POST OP DBP_0 Mins	75.24	7.98	74.12	7.13	0.740	0.461	-1.88	4.12
POST OP DBP_15 Mins	77.24	7.09	75.80	6.93	1.027	0.307	-1.34	4.22
POST OP DBP_30 Mins	76.60	7.12	75.92	7.19	0.475	0.636	-2.16	3.52
POST OP DBP_45 Mins	77.04	7.37	75.08	7.96	1.278	0.204	-1.08	5.00
POST OP DBP_60 Mins	76.70	7.31	74.04	6.24	1.957	0.053	-0.04	5.36
POST OP DBP_2 Hrs	76.76	7.44	75.32	7.31	0.976	0.331	-1.49	4.37
POST OP DBP_3 Hrs	76.68	6.36	75.72	5.90	0.783	0.436	-1.47	3.39
POST OP DBP_4 Hrs	76.36	6.56	76.16	6.58	0.152	0.879	-2.41	2.81
POST OP DBP_5 Hrs	78.04	5.72	76.44	5.65	1.407	0.162	-0.66	3.86
POST OP DBP_6 Hrs	78.40	6.22	77.86	7.82	0.382	0.703	-2.26	3.34

The postoperative DBP was comparable at all times in both the groups ($p > 0.05$).

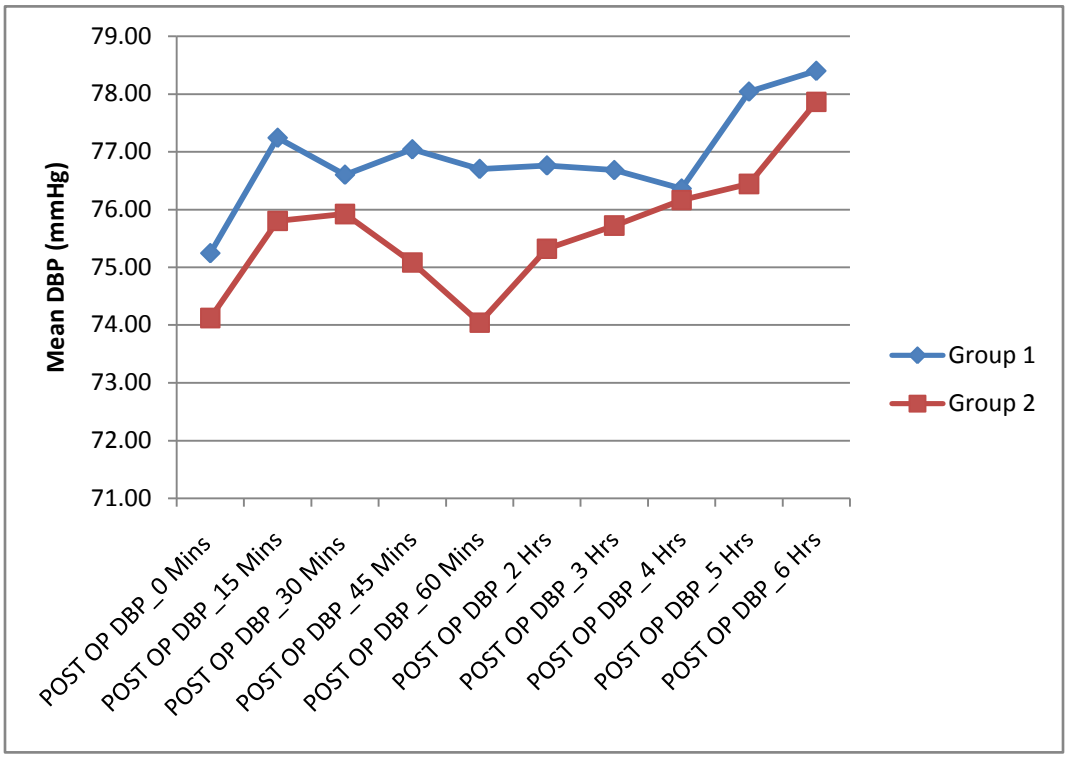

Figure 15- Postoperative diastolic blood pressure (DBP) trend in both groups (in mmHg)

Table 16- Postoperative mean arterial pressure (MAP) trend in both groups (in mmHg)

	Group 1		Group 2		t	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
POST OP MAP_0 Mins	92.17	7.35	90.57	6.85	1.127	0.263	-1.22	4.42
POST OP MAP_15 Mins	93.52	7.04	91.57	6.49	1.438	0.154	-0.74	4.63
POST OP MAP_30 Mins	93.53	6.12	92.27	7.07	0.958	0.340	-1.36	3.89
POST OP MAP_45 Mins	94.11	7.00	91.80	7.89	1.547	0.125	-0.65	5.27
POST OP MAP_60 Mins	93.71	7.72	91.17	6.47	1.779	0.078	-0.29	5.36
POST OP MAP_2 Hrs	93.53	7.44	91.96	7.18	1.076	0.284	-1.33	4.47
POST OP MAP_3 Hrs	93.81	6.54	92.25	5.89	1.254	0.213	-0.91	4.03
POST OP MAP_4 Hrs	93.55	6.28	92.59	6.52	0.755	0.452	-1.57	3.51
POST OP MAP_5 Hrs	94.88	5.26	93.05	5.61	1.679	0.096	-0.33	3.99
POST OP MAP_6 Hrs	94.65	5.37	94.21	7.08	0.350	0.727	-2.05	2.93

The post operative MAP comparable at all times in both the groups with no statistically significant difference ($p > 0.05$).

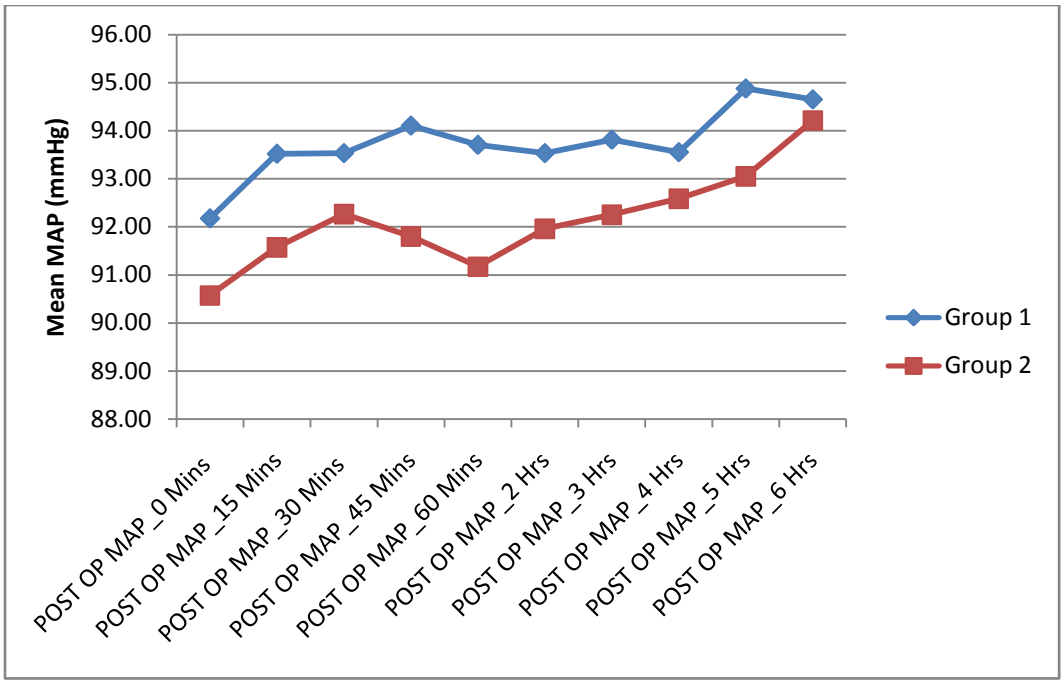

Figure 16- Postoperative mean arterial pressure (MAP) trend in both groups (in mmHg)

Table 17- Trend in postoperative respiratory rate in both groups (per Min)

	Group 1		Group 2		t	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
POST OP RR_0 Mins	14.96	1.52	15.12	1.47	-0.535	0.594	-0.75	0.43
POST OP RR_15 Mins	15.08	1.35	15.20	1.51	-0.418	0.677	-0.69	0.45
POST OP RR_30 Mins	15.04	1.35	15.28	1.44	-0.857	0.393	-0.80	0.32
POST OP RR_45 Mins	14.56	1.72	14.84	1.52	-0.864	0.389	-0.92	0.36
POST OP RR_60 Mins	14.12	2.40	14.80	1.51	-1.693	0.094	-1.48	0.12
POST OP RR_2 Hrs	14.24	1.74	14.48	1.74	-0.689	0.493	-0.93	0.45
POST OP RR_3 Hrs	13.92	1.66	14.20	1.73	-0.826	0.411	-0.95	0.39
POST OP RR_4 Hrs	13.52	1.54	13.88	1.78	-1.081	0.282	-1.02	0.30
POST OP RR_5 Hrs	13.36	1.59	13.72	1.57	-1.142	0.256	-0.99	0.27
POST OP RR_6 Hrs	13.24	1.61	13.76	1.88	-1.485	0.141	-1.21	0.17

The respiratory rate was comparable in both the groups at all times postoperatively ($p > 0.05$).

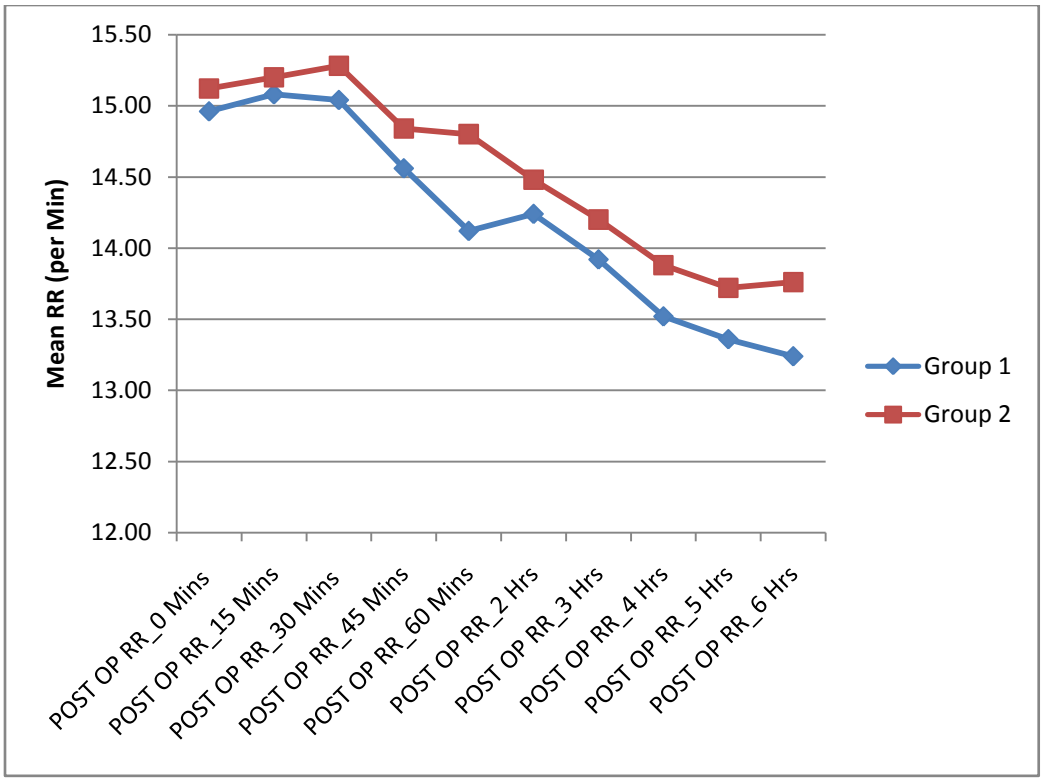

Figure 17- Trend in postoperative respiratory rate in both groups (per Min)

Table 18- Trend in postoperative peripheral oxygen saturation (SpO_2) in both groups (in %)

	Group 1		Group 2		Z	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
POST OP SpO_2_0 Mins	98.22	1.11	98.14	1.14	-0.200	0.842	0.80	0.94
POST OP SpO_2_15 Mins	97.96	0.88	98.16	1.04	-0.921	0.357	0.23	0.41
POST OP SpO_2_30 Mins	97.82	1.00	97.68	0.96	-0.619	0.536	0.44	0.64
POST OP SpO_2_45 Mins	97.86	0.93	97.70	1.05	-0.921	0.357	0.23	0.41
POST OP SpO_2_60 Mins	97.74	0.96	98.02	0.94	-1.592	0.111	0.05	0.17
POST OP SpO_2_2 Hrs	97.80	0.90	97.84	0.93	-0.082	0.935	0.89	0.99
POST OP SpO_2_3 Hrs	97.92	0.88	97.70	1.18	-0.894	0.371	0.22	0.40
POST OP SpO_2_4 Hrs	97.80	0.99	97.62	0.90	-1.202	0.229	0.17	0.33
POST OP SpO_2_5 Hrs	98.00	0.83	97.84	0.98	-1.020	0.308	0.21	0.39
POST OP SpO_2_6 Hrs	97.94	0.87	98.10	0.93	-1.081	0.280	0.19	0.37

The peripheral oxygen saturation of both the groups was comparable at all times postoperatively ($p > 0.05$).

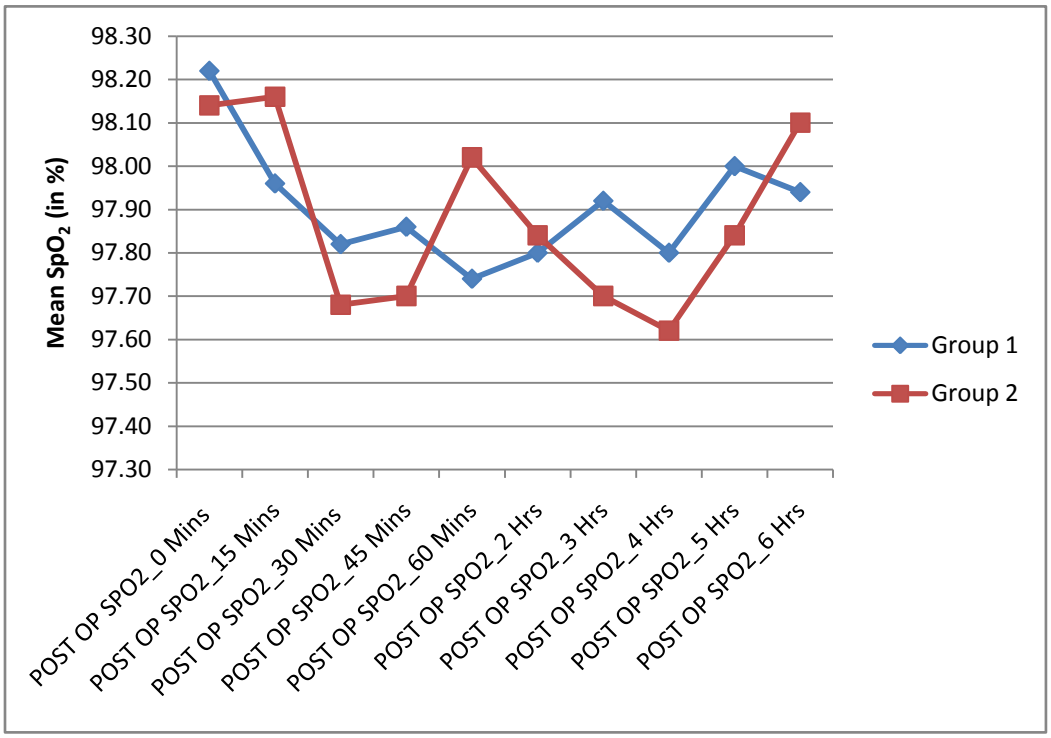

Figure 18- Trend in postoperative peripheral oxygen saturation (SpO_2) in both groups (in %)

Table 19- Visual analogue scale (VAS) score in both groups at the 2nd, 4th and 6th postoperative hour

	Group 1		Group 2		Z	p-value	95% Confidence Interval of the Difference	
	Median	IQR	Median	IQR			Lower	Upper
POST OP VAS_0 Mins	0.00	0-0	0.00	0-0	-1.000	0.317	0.97	1.00
POST OP VAS_15 Mins	0.00	0-0	0.00	0-0	-0.560	0.576	0.97	1.00
POST OP VAS_30 Mins	0.00	0-0	0.00	0-0	-0.429	0.668	0.85	0.97
POST OP VAS_45 Mins	0.00	0-0	0.00	0-0	-0.718	0.472	0.41	0.61
POST OP VAS_60 Mins	0.00	0-0	0.00	0-0	-1.056	0.291	0.25	0.43
POST OP VAS_90 Mins	0.00	0-1.0	0.00	0-1.0	-0.276	0.783	0.65	0.83
POST OP VAS_120 Mins	1.00	0-2.0	0.00	0-2.0	-0.108	0.914	0.89	0.99
POST OP VAS_150 Mins	1.00	0-2.0	1.00	0-2.0	-0.326	0.744	0.67	0.83
POST OP VAS_3 Hrs	2.00	1-3.0	2.00	1-3.0	-0.556	0.578	0.52	0.72
POST OP VAS_4 Hrs	3.00	2-4.0	2.00	2-3.0	-1.458	0.145	0.04	0.16
POST OP VAS_5 Hrs	3.00	2-4.0	3.00	3-4.0	-0.062	0.950	0.92	1.00
POST OP VAS_6 Hrs	4.00	3-4.0	4.00	3-4.0	-0.660	0.510	0.44	0.64

Trend in postoperative VAS scores were comparable at 2nd, 4th and 6th hours postoperatively with no statistically significant difference ($p > 0.05$).

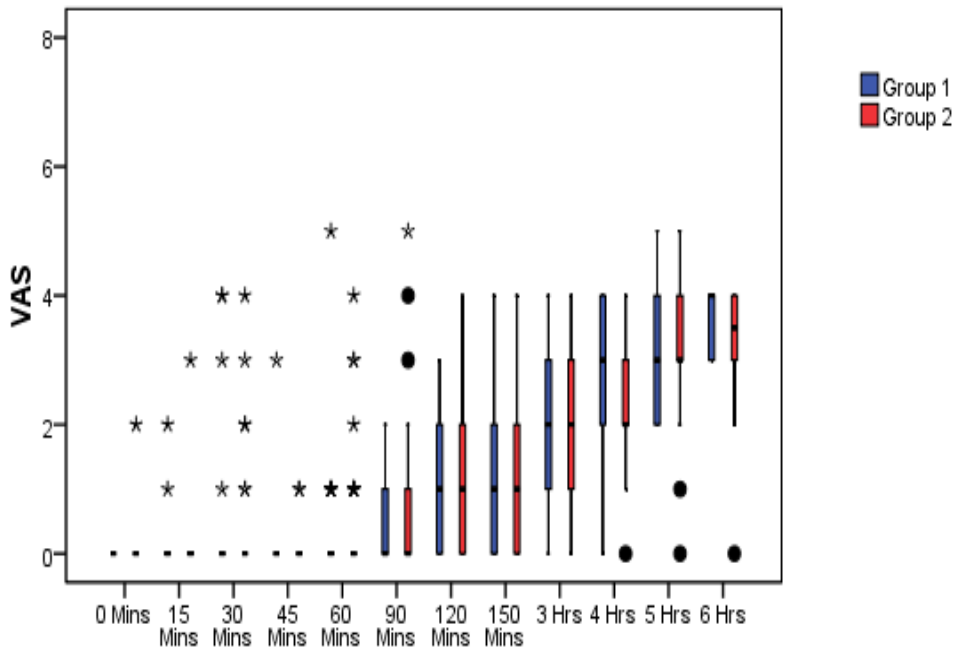

Figure 19- Visual analogue scale (VAS) score in both groups at the 2nd, 4th and 6th postoperative hour

Table 20- Mean time of 1st analgesic requirement in both groups (in minutes)

	Group 1		Group 2		Z	p-value	95% Confidence Interval of the Difference	
	Mean	SD	Mean	SD			Lower	Upper
Time of 1st analgesic postoperatively	276.90	95.89	280.20	117.93	-0.133	0.894	0.78	0.92

The mean time of 1st analgesic requirement was 276.90 ± 95.89 min in group 1 and 280.20 ± 117.93 min in group 2. The difference was statistically insignificant with a p value of more than 0.05.

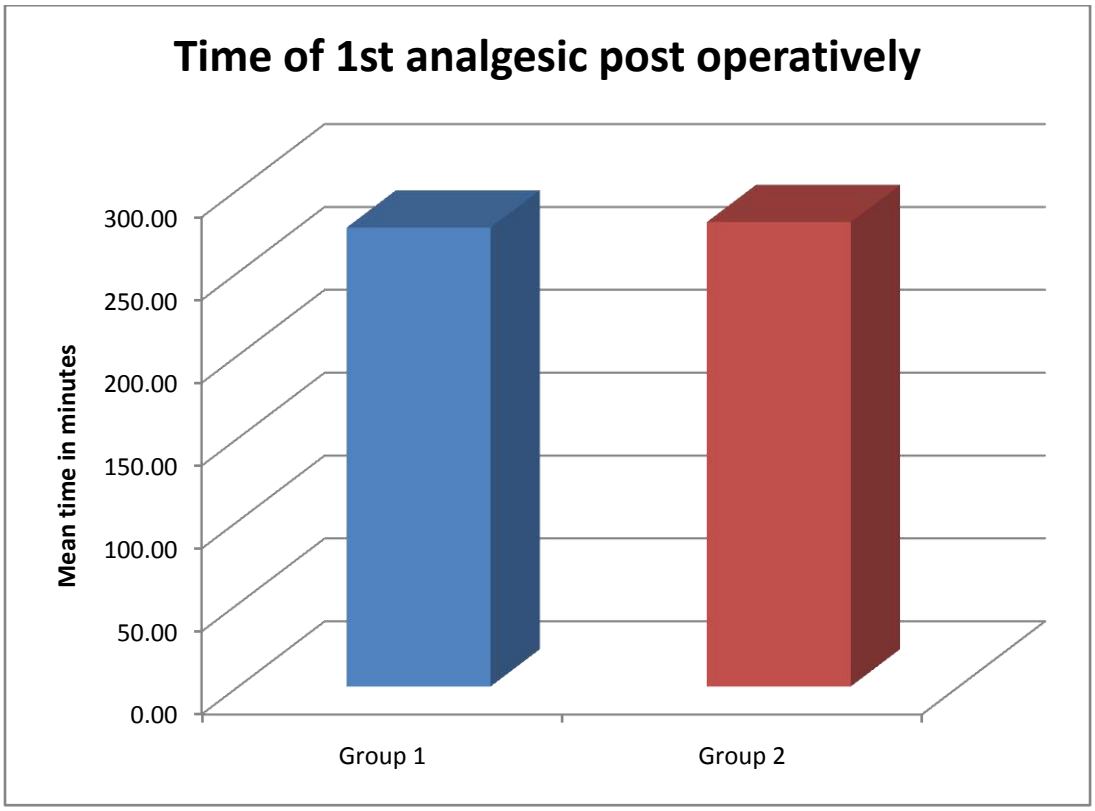

Figure 20- Mean time of 1st analgesic requirement in both groups (in minutes)

DISCUSSION

Subarachnoid block is the most common anaesthetic technique used for lower limb orthopaedic surgeries. It provides advantages of rapidity of onset, ease of administration, predictability and reliability. Various adjuvants are used along with local anaesthetics intrathecally which prolong the duration of analgesia, sensory and motor block and reduce the side effects of local anaesthetics by reducing their dose required. These include both opioid and non opioid adjuvants like fentanyl, morphine, midazolam, ketamine, neostigimine and steroids. Fentanyl, a μ opioid receptor agonist, is the most commonly used opioid as an intrathecal additive but has various side effects like pruritis, nausea, vomiting, respiratory depression and urinary retention. Magnesium sulphate, a non opioid, is a centrally acting NMDA antagonist. Painful stimuli release aspartate and glutamate which cause calcium entry into cells which is responsible for pain signaling. NMDA receptor antagonism in the dorsal horn of spinal cord by magnesium sulphate inhibits this signalling thus preventing central sensitization from peripheral pain stimulation. In addition, it provides the benefit of lack of side effects associated with opioid receptor stimulation.

In our study, we compared fentanyl and magnesium sulphate as additives to intrathecal 0.5% hyperbaric bupivacaine in patients undergoing lower limb orthopaedic surgeries in terms of onset and duration of sensory and motor block and haemodynamic parameters. All our patients were comparable in terms of age ($p > 0.05$), sex distribution ($p > 0.05$), BMI ($p > 0.05$) and ASA physical status ($p > 0.05$). Fentanyl (25μg) and magnesium sulphate (100 mg) were used as adjuvants to 0.5% hyperbaric bupivacaine (12.5 mg). The dose of magnesium sulphate was decided in concordance with the observations made by Katiyar S et al.[19] They performed a study on 4 groups who received intrathecal saline, 25 μg fentanyl, 50mg and 100mg of magnesium sulphate and concluded an

increased duration of analgesia in the group which received 100 mg of magnesium sulphate as compared to the group which received 50mg magnesium sulphate. We, therefore, chose to use 100mg of magnesium sulphate as the additive.

In our study, the mean time of onset of sensory and motor block was faster in the fentanyl group as compared to the magnesium sulphate group ($p < 0.05$) .Our results were similar to the observations made by Khezri MB et al[24] and Unlugenc H et al[26] in their study. This could probably be attributed to change in baricity and pH of the intrathecal solution by addition of magnesium sulphate which was also reported by Malleswaran S et al[20] and Arora B et al[21] in their study. Furthermore, increase in metabolism of bupivacaine due to activation of cytochrome p450 by magnesium sulphate may have been responsible for the delayed onset of sensory and motor block with use of intrathecal magnesium sulphate. In addition to this, magnesium sulphate causes local vasodilation which increases vascular uptake of the local anaesthetic agent. All these reasons explain the reason for the delay in onset of sensory and motor block in case of magnesium sulphate group.

The mean duration of sensory and motor block were comparable in both the groups of our study ($p > 0.05$). This was in contrast to the observation made by Khezri MB et al[24] and Unlugenc H et al[26] who found a prolongation in duration of sensory block in fentanyl group as compared to the magnesium sulphate group. The difference in results in our study was probably due to a higher dose of magnesium sulphate used in our study. Khezri MB et al[24] and Unlugenc H et al[26] used 50mg of magnesium sulphate whereas we used 100 mg of magnesium sulphate in our study which could have increased the duration of sensory and motor block making it comparable to that of fentanyl group.

We observed that the maximum level of sensory block attained was comparable in both groups ($p > 0.05$) but T4 level of maximum block

height was obtained in 40% patients in the fentanyl group and 24% patients in the magnesium sulphate group. Although the difference was clinically significant but it was not statistically significant ($p > 0.05$). The time to attain highest level of sensory block were comparable in both the groups ($p > 0.05$). This was not in concordance with the results obtained by Unlugenc H et al[26] who found that the mean time to attain maximum block height was shorter in the fentanyl group as compared to magnesium sulphate group.

The time of 1st analgesic requirement and the VAS scores at 2nd, 4th and 6th hr post-operatively of both groups were comparable ($p > 0.05$) which was in contrast to the observations made by Khezri MB et al who noted a longer duration of analgesia in case of fentanyl group. This could be explained due to the lower dose i.e. 50 mg of magnesium sulphate used by Khezri MB et al.[24] Katiyar S et al used both 50 mg and 100 mg magnesium sulphate in their study and found that duration of analgesia was higher in the group which received 100mg magnesium sulphate as compared to the group which received 50 mg magnesium sulphate.[19]

The systolic, diastolic and mean arterial pressure were comparable at all times intra and post operatively in both the groups ($p > 0.05$). The difference in mean heart rate of both the groups was statistically insignificant ($p > 0.05$). The respiratory rate and peripheral oxygen saturation remained comparable in both the groups ($p > 0.05$). Intraoperative bradycardia was seen in 44% patients in fentanyl group and 38% patients in magnesium sulphate group and intraoperative hypotension was seen in 50% and 54% patients in group 1 and 2 respectively. This difference in the incidence of intraoperative bradycardia and hypotension was statistically insignificant ($p > 0.05$). Thus, the haemodynamic profile of patients receiving either fentanyl or magnesium sulphate was in concordance with the observations made by Unlugenc H

et al[26] who also observed that haemodynamic parameters of fentanyl and magnesium sulphate groups were comparable.

SUMMARY AND CONCLUSION

The present study, after approval from the ethics committee, was conducted in the Department of Anaestheisa, Dayanand Medical College and Hospital, Ludhiana. It was a comparative study of intrathecal fentanyl versus magnesium sulphate as adjuvants to bupivacaine in lower limb orthopaedic surgeries under subarachnoid block. The study was performed on 100 patients of either sex, in the age group 18-70 years and belonging to ASA grade I and II. A detailed preanesthetic checkup was done and a written informed consent was taken from all the patients.

The patients were divided into 2 groups of 50 each:

Group 1 : Patients in this group received 2.5 mL of 0.5% hyperbaric bupivacaine (12.5 mg) + 0.5 mL of fentanyl (25 µg) to make a total volume of 3 mL.

Group 2 : Patients in this group received 2.5 mL of 0.5% hyperbaric bupivacaine (12.5mg) + 0.2 mL of magnesium sulphate (100 mg) with 0.3 mL of distilled water to make total volume of 3 mL.

All our patients were demographically comparable in terms of age, sex distribution, BMI and ASA physical status. The onset of sensory and motor block was significantly faster in the group receiving fentanyl as compared to group receiving magnesium sulphate ($p < 0.05$). The two groups were similar in terms of duration of sensory block, motor block , highest level of sensory block attained and time to attain this highest level, time of 1st analgesic requirement, postoperative VAS scores and intra and postoperative haemodynamic parameters ($p > 0.05$).

Although, both fentanyl and magnesium sulphate showed almost similar results in terms of duration of sensory and motor block, highest level of sensory block and haemodynamic parameters but because of the faster onset of both sensory and motor block in the group receiving fentanyl, we favour use of fentanyl over magnesium sulphate. Thus,

fentanyl is a better adjuvant to intrathecal bupivacaine as compared to magnesium sulphate.

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Sr. No	INITIALS	Age	sex	Treatment Group	Admission No.	BMI	COMORBIDITIES	ASA Grade	HR_0 Mins	HR_5	HR_10	HR_15	HR_30	HR_45	HR_60	HR_75	HR_90	SBP_0 Mins	SBP_5	SBP_10	SBP_15	SBP_30	SBP_45	SBP_60	SBP_75	SBP_90	DBP_0 Mins	DBP_5	DBP_10	DBP_15	DBP_30	DBP_45	DBP_60	DBP_75	DBP_90	MAP_0 Mins	MAP_5
1	P	17	M	2	95887	24	none	1	123	133	105	122	99	102	104	106	104	138	128	124	100	102	108	110	112	114	70	73	56	65	57	58	70	68	70	93	96
2	BS	18	M	2	863603	21	pleural TB	2	86	85	84	86	88	88	90	85	90	140	130	90	130	120	123	120	126	129	78	84	50	63	58	51	51	57	57	99	107
3	NS	45	M	2	864991	21	alcoholic	2	81	96	89	87	88	94	58	76	80	120	110	102	108	94	108	80	112	110	74	58	58	58	58	60	40	60	70	85	80
4	KS	18	M	2	868070	21	none	1	87	78	68	64	78	74	76	80	82	116	98	98	102	108	108	110	112	116	64	50	46	56	54	56	70	72	70	86	68
5	JK	30	F	2	806425	29	none	1	70	70	68	70	64	68	70	72	68	128	108	90	116	110	120	126	120	128	78	64	50	70	70	70	74	70	74	95	79
6	RS	25	M	1	816614	22	none	1	76	60	52	66	68	70	72	74	76	140	110	108	116	120	130	130	134	138	90	70	60	70	74	70	80	80	88	107	83
7	SK	62	M	1	805563	30	HTN,Obese-I	2	100	92	88	74	76	78	80	82	84	140	130	120	126	130	132	136	130	130	70	60	50	70	80	84	80	70	80	93	83
8	AS	62	M	2	805363	25	none	1	80	78	80	78	76	78	82	80	82	140	120	110	116	120	130	128	140	140	90	70	60	70	80	80	86	80	90	107	87
9	PS	29	M	1	798267	22	none	1	84	73	72	70	72	74	76	80	84	120	112	126	110	116	120	126	122	120	70	80	62	68	70	60	70	74	80	87	91
10	MK	26	F	2	814775	26	none	1	78	74	60	58	60	64	68	70	72	128	116	108	116	120	120	122	122	124	80	70	60	80	84	70	80	82	80	96	85
11	PS	24	M	1	826534	26	none	1	130	126	100	106	108	110	106	102	100	110	98	85	90	108	112	110	112	110	58	60	34	50	60	62	60	62	70	75	73
12	LS	27	M	2	713012	23	none	1	104	98	92	94	88	94	94	94	92	140	96	102	122	112	118	122	122	118	86	48	48	66	62	65	60	72	66	104	64
13	GS	26	M	1	736757	26	none	1	105	104	102	98	106	106	102	104	100	136	120	118	116	114	114	120	130	128	80	66	60	54	60	56	62	80	70	99	84
14	BS	50	M	1	756755	25	none	1	104	90	88	86	86	84	82	86	88	136	102	116	118	120	130	132	140	130	86	70	74	78	80	80	82	80	80	103	81
15	NS	43	M	1	817278	24	none	1	70	54	65	66	68	70	72	74	70	140	108	116	120	130	140	140	132	140	90	70	80	80	82	80	90	80	82	106	83
16	RPS	46	M	1	747482	25	DM	2	74	70	64	68	66	70	72	74	70	120	114	108	110	102	112	114	116	120	80	76	70	70	68	70	80	72	70	93	89
17	DS	25	M	2	703204	23	none	1	90	85	68	68	68	85	74	78	80	140	130	108	124	120	130	130	132	140	90	68	60	80	70	70	80	82	80	107	89
18	SK	34	F	1	814909	28	none	1	76	68	82	78	74	78	80	78	76	120	90	112	110	116	120	128	130	130	80	60	64	70	84	70	74	70	80	93	70
19	JS	24	M	1	202237	25	none	1	74	66	70	72	70	74	78	80	74	120	102	110	118	120	116	118	120	122	70	60	70	68	70	72	74	70	74	87	74
20	T	24	F	1	202497	22	none	1	74	64	60	70	74	78	72	80	72	130	90	100	116	118	120	126	128	130	74	52	60	74	76	72	74	72	70	93	65
21	JS	50	M	1	922239	25	none	1	110	90	92	96	94	100	102	100	102	134	110	106	110	112	116	120	122	130	78	64	60	70	74	78	70	72	70	97	79
22	JS	58	M	2	946230	23	none	1	70	60	60	56	56	56	56	56	60	138	136	124	116	112	104	122	132	130	86	74	74	72	64	68	72	82	80	103	95
23	NK	26	F	2	372432	25	none	1	80	78	100	118	100	96	88	86	80	122	108	90	102	114	118	110	118	110	76	60	46	38	62	70	80	74	70	88	76
24	YK	21	M	1	800507	23	none	1	120	118	104	100	102	106	108	110	108	130	118	110	112	120	130	130	126	124	80	64	62	70	70	70	80	74	78	97	82
25	MS	42	M	2	694766	25	HTN,DM	2	110	116	116	106	106	104	102	104	102	138	140	138	136	132	140	130	132	86	68	74	70	70	72	70	80	84	100	99
26	JK	45	F	2	764249	20	HTN	2	65	50	38	80	80	78	78	80	60	128	118	108	116	108	104	108	110	118	70	60	58	58	56	64	56	60	60	89	78
27	SS	30	M	2	732477	26	none	1	89	85	84	80	78	78	98	90	88	128	124	120	116	110	108	100	112	110	90	90	80	70	70	68	64	70	70	103	101
28	P	33	F	1	763534	31	Obese-I	2	88	80	76	70	68	64	56	60	74	120	108	90	98	96	98	90	102	114	74	60	50	54	54	60	62	62	60	94	76
29	GS	26	M	1	760429	23	none	1	120	118	112	116	110	108	108	110	106	140	120	90	96	118	120	124	128	130	90	90	40	36	70	74	78	80	80	107	100
30	D	24	M	2	764855	24	none	1	56	60	62	68	56	60	68	70	74	128	116	110	100	118	120	126	128	130	80	70	64	60	72	74	78	80	80	96	85
31	KS	40	M	1	761852	22	alcoholic	2	96	90	90	92	90	89	88	86	88	140	140	120	122	132	138	140	140	138	80	86	84	80	84	90	90	90	88	100	104
32	JS	37	M	1	765036	25	none	1	70	68	70	70	78	80	84	80	82	116	126	128	130	128	133	121	124	130	82	82	84	86	84	84	82	76	84	93	97
33	RB	52	M	2	770233	32	DM,HTN,BA,Obese-I	2	106	98	98	90	86	86	86	84	86	106	80	108	110	112	114	114	118	120	74	38	56	60	68	70	72	74	70	85	52
34	JK	45	F	2	764249	23	HTN	2	94	60	40	98	102	100	98	96	88	118	118	88	110	118	120	118	110	108	80	68	58	60	70	70	74	70	72	93	85
35	BS	56	M	2	598971	24	none	1	86	80	74	72	74	76	68	62	70	122	120	124	122	122	124	118	108	110	78	80	78	76	74	74	74	68	70	93	94
36	MK	56	M	1	765582	24	Seizure disorder	2	122	110	100	100	95	92	90	98	98	140	130	126	124	124	120	126	138	140	90	80	76	76	70	72	78	80	86	107	97
37	JS	30	M	1	183741	24	none	1	80	60	56	56	58	60	64	70	72	130	120	132	130	128	118	128	122	120	80	80	88	70	78	74	72	74	70	97	93
38	A	18	M	1	43285	18	none	1	120	116	118	114	112	110	104	100	98	130	108	116	118	120	122	126	118	120	80	60	70	90	86	84	76	72	80	97	76
39	SS	70	M	2	777815	24	none	1	90	94	92	92	72	70	70	74	78	140	126	124	116	138	136	138	130	120	70	88	86	82	86	90	88	70	70	93	104
40	HK	35	M	1	766106	23	none	1	104	98	82	76	80	84	86	82	84	140	124	104	126	130	132	124	120	118	82	74	76	80	70	72	68	70	68	101	95
41	HS	36	M	2	771949	23	none	1	112	94	80	70	64	68	70	72	74	140	134	126	128	124	122	120	116	118	88	74	64	70	66	60	70	72	74	105	98
42	T	24	F	1	202497	24	none	1	106	100	98	92	86	64	70	74	80	140	140	138	122	120	116	124	128	130	80	80	82	64	66	62	78	80	84	100	100
43	PS	38	M	1	761926	22	none	1	112	108	108	106	104	100	98	100	98	136	140	138	126	130	138	130	128	120	90	78	84	76	70	74	80	74	70	105	99
44	RR	50	F	1	774344	26	none	1	78	76	74	74	74	78	74	70	72	138	120	112	108	128	106	138	130	130	80	70	68	60	70	64	78	70	80	99	87
45	VK	35	M	1	763482	25	none	1	80	72	64	70	74	78	80	82	80	130	90	98	116	120	126	130	122	120	80	60	64	70	74	78	70	72	70	97	70
46	CK	60	M	2	773980	29	none	1	78	74	72	68	64	64	68	70	72	140	140	136	140	138	140	130	140	130	90	80	70	80	68	70	80	90	70	107	100
47	JS	30	M	1	747402	23	none	1	74	70	68	64	64	70	72	70	72	140	140	134	138	138	130	130	134	132	90	90	90	88	88	80	70	78	74	107	107
48	AR	26	F	2	800440	30	none	1	94	86	76	68	70	72	74	78	80	136	126	120	116	112	120	124	122	130	88	76	70	70	74	70	74	72	70	114	92
49	GS	19	M	2	793452	18	none	1	90	94	92	84	74	72	80	78	74	140	124	128	126	128	130	132	134	138	76	82	70	74	72	70	82	84	78	103	98
50	SS	50	M	2	802472	27	none	1	92	70	60	64	74	70	70	68	74	140	120	108	120	132	130	126	128	130	90	60	56	80	70	68	80	84	80	107	80
51	HS	37	M	2	180301	18	BA	2	86	84	82	80	80	82	78	80	82	122	100	98	90	94	108	114	112	116	88	80	78	64	64	74	74	60	70	99	87
52	A	32	M	2	834921	24	none	1	90	88	84	82	80	82	84	82	80	126	108	104	108	104	106	112	114	116	74	60	60	66	70	72	80	78	74	95	76
53	GS	29	M	1	920356	27	none	1	80	70	62	58	68	50	60	64	84	136	130	126	116	118	112	116	123	120	80	70	64	60	50	54	50	60	56	99	90
54	KK	49	F	2	699649	33	Hypothyroid,obese-I	2	116	130	130	120	108	116	104	102	106	140	118	116	120	126	128	128	130	130	90	68	62	78	78	72	80	88	88	107	90
55	GS	57	M	1	550220	25	alcoholic	2	120	116	110	90	80	84	88	86	88	120	80	90	98	100	108	110	116	120	80	50	52	60	64	70	76	78	80	94	60
56	SK	63	F	1	232734	28	HTN	2	90	70	60	68	70	74	76	74	78	130	90	80	100	108	112	110	110	114	80	60	50	70	78	68	70	74	78	97	70
57	SK	19	M	2	819738	20	none	1	86	70	58	70	64	68	68	70	70	136	116	104	120	124	128	128	130	128	80	70	56	70	76	76	78	80	76	99	85
58	BS	35	M	2	809535	24	none	1	80	78	82	80	80	78	76	78	80	130	124	128	116	130	130	134	128	114	80	76	78	70	70	80	70	70	70	97	92
59	TS	29	M	1	816595	23	none	1	80	60	54	60	66	68	70	70	72	130	102	80	90	108	110	112	116	120	80	60	50	60	60	70	74	78	80	97	74
60	AKG	50	M	2	938470	28	none	1	70	70	68	68	66	68	70	72	70	116	114	102	106	104	110	116	114	120	70	68	66	64	62	70	70	70	70	85	83
61	NK	50	M	1	917450	24	none	1	84	80	70	66	64	90	84	74	70	112	110	80	90	102	112	118	120	118	66	62	48	50	60	64	70	70	68	82	79
62	PS	60	M	2	707083	25	HTN	2	88	90	92	88	96	92	88	108	100	140	136	120	116	90	126	124	124	122	90	80	64	66	50	70	80	88	80	106	99
63	AS	30	M	2	749055	24	none	1	74	68	64	70	68	68	72	68	68	140	116	108	130	128	122	126	140	126	90	80	50	60	70	78	80	64	70	107	92

Sr. No	INITIALS	MAP_10	MAP_15	MAP_30	MAP_45	MAP_60	MAP_75	MAP_90	BRADYCARDIA	HYPOTENSION	RR_0 Mins	RR_5	RR_10	RR_15	RR_30	RR_45	RR_60	RR_75	RR_90	SPO2_0 Mins	SPO2_5	SPO2_10	SPO2_15	SPO2_30	SPO2_45	SPO2_60	SPO2_75	SPO2_90	SENSORY BLOCK_0 Mins	SENSORY BLOCK_5	SENSORY BLOCK_10	SENSORY BLOCK_15	SENSORY BLOCK_30
1	P	80	81	74	76	83	83	85	YES	YES	16	16	18	16	16	16	14	16	14	100	100	100	100	100	100	98	99	100	L1	T8	T8	T6	T6
2	BS	73	90	84	84	82	84	85	NO	YES	16	16	16	16	16	18	18	16	16	98	98	100	100	100	100	100	100	100	L1	T12	T8	T8	T6
3	NS	74	74	69	76	53	77	83	YES	YES	16	16	16	16	16	16	16	16	16	100	100	100	100	100	100	100	100	100	L1	T12	T8	T6	T6
4	KS	64	76	76	74	83	85	85	YES	NO	16	16	16	16	16	16	14	16	14	100	100	100	100	100	100	98	97	98	L1	L1	T12	T8	T6
5	JK	63	85	83	87	91	87	92	NO	YES	14	14	14	14	16	16	14	16	14	100	98	96	98	95	96	96	97	98	L1	T12	T10	T8	T6
6	RS	76	85	89	90	97	98	104	YES	YES	16	14	16	14	14	14	16	14	14	98	97	98	97	98	97	98	97	98	L1	T10	T8	T6	T4
7	SK	73	89	97	100	99	90	97	YES	NO	14	12	14	14	16	16	18	16	14	97	97	96	95	96	97	96	96	97	-	T10	T8	T6	T4
8	AS	77	85	93	97	100	100	106	NO	YES	14	16	18	16	16	14	14	12	12	98	97	96	97	96	97	97	98	97	-	T10	T8	T8	T8
9	PS	83	82	85	80	89	90	93	NO	NO	14	14	16	18	16	14	14	12	14	98	97	96	97	98	97	98	99	98	-	T8	T6	T6	T6
10	MK	76	92	96	87	94	95	95	YES	NO	14	14	16	16	18	14	14	16	14	98	97	96	96	96	96	97	97	98	-	T8	T6	T4	T4
11	PS	51	63	76	79	77	79	83	YES	YES	16	14	16	14	14	14	16	16	14	97	98	97	98	97	96	98	97	98	-	T12	T10	T8	T6
12	LS	66	85	79	83	81	89	83	NO	YES	14	14	16	16	18	16	16	14	12	98	97	96	95	96	97	98	99	98	-	T8	T8	T8	T8
13	GS	79	75	78	75	81	97	89	NO	NO	14	14	16	16	18	16	16	14	14	97	98	97	96	97	96	97	98	97	-	T10	T8	T8	T8
14	BS	88	91	93	97	99	100	97	YES	YES	14	14	12	14	12	14	14	14	14	98	97	96	97	96	97	96	97	98	-	T12	T10	T10	T8
15	NS	92	93	98	100	106	97	101	YES	YES	14	14	16	12	14	12	12	14	14	98	97	96	96	97	98	98	97	98	-	T10	T8	T6	T4
16	RPS	83	83	79	84	91	87	87	NO	NO	16	14	14	14	18	14	14	14	14	97	98	97	98	97	96	97	97	99	-	T8	T6	T6	T6
17	DS	76	94	87	90	97	99	100	YES	YES	14	16	16	18	18	14	14	14	16	99	98	99	100	98	97	97	98	99	-	T8	T6	T6	T6
18	SK	80	83	95	87	92	90	97	NO	YES	16	16	16	14	16	18	16	16	16	98	99	98	97	98	99	98	99	99	-	T10	T8	T4	T4
19	JS	83	85	87	87	89	87	90	NO	NO	14	16	14	16	16	16	14	14	14	98	97	97	96	97	99	98	99	98	-	T12	T10	T8	T4
20	T	73	88	90	88	91	91	90	NO	YES	16	16	14	16	16	18	16	16	16	98	99	98	97	96	97	98	99	100	-	T8	T6	T6	T6
21	JS	75	83	87	91	87	89	90	NO	YES	20	18	20	20	20	18	18	16	16	98	99	98	97	96	97	98	98	99	-	T8	T6	T4	T4
22	JS	94	95	89	87	91	103	97	YES	YES	16	16	16	16	16	16	16	16	16	100	100	100	100	100	100	100	99	98	-	T12	T10	T10	T8
23	NK	61	59	79	86	90	89	83	NO	YES	16	16	16	16	16	14	14	14	14	99	99	98	98	99	98	99	98	99	-	L1	T12	T10	T6
24	YK	80	86	87	90	97	91	93	NO	NO	14	16	16	16	14	14	14	14	14	98	97	96	97	97	97	96	97	97	-	T12	T10	T10	T4
25	MS	88	85	91	97	90	97	100	NO	NO	16	16	18	18	16	16	16	14	14	99	97	97	98	100	98	99	98	99	-	T12	T10	T8	T8
26	JK	75	77	73	78	79	77	94	YES	NO	16	14	12	12	12	12	12	12	12	100	98	97	98	97	98	97	96	97	-	T10	T6	T4	T4
27	SS	93	85	83	83	77	84	83	NO	YES	16	16	16	12	12	16	12	12	12	100	100	99	100	100	100	98	97	98	-	L1	T12	T10	T8
28	P	63	69	67	75	72	80	83	YES	YES	16	16	16	12	12	16	12	10	10	100	98	95	100	100	100	100	100	100	-	T12	T10	T8	T8
29	GS	67	56	87	89	93	96	97	NO	YES	16	16	18	18	16	16	14	14	14	100	98	97	96	97	98	97	98	97	-	T12	T8	T4	T4
30	D	79	73	87	89	94	96	97	NO	YES	14	14	14	16	16	14	16	16	14	98	97	98	97	98	97	98	96	97	-	T12	T10	T8	T8
31	KS	96	94	100	104	107	107	105	NO	NO	16	16	16	16	16	16	14	14	14	100	100	100	100	100	100	98	98	100	-	T10	T8	T4	T4
32	JS	99	102	99	101	95	93	99	NO	NO	14	12	16	18	18	16	14	14	14	98	99	98	99	98	97	97	96	97	-	T8	T8	T6	T6
33	RB	73	77	83	85	86	90	87	YES	YES	16	16	18	18	16	18	16	16	14	94	96	98	97	97	97	97	97	97	-	T8	T4	T4	T4
34	JK	68	77	89	87	89	83	84	YES	YES	16	16	16	16	16	14	14	14	14	100	100	100	100	100	98	98	99	98	-	T10	T8	T8	T4
35	BS	93	91	90	91	95	86	83	YES	NO	16	16	18	16	16	16	16	16	16	95	96	96	95	96	99	96	97	96	-	L2	L2	T12	T8
36	MK	95	92	93	89	100	99	104	YES	NO	16	14	12	12	12	12	12	12	12	100	100	98	96	96	96	96	96	96	-	T12	T10	T8	T4
37	JS	103	90	95	89	91	90	87	YES	NO	14	14	16	16	18	16	14	14	14	98	97	97	96	97	97	98	97	98	-	T10	T8	T6	T6
38	A	85	99	97	97	100	90	93	NO	NO	12	16	18	16	16	16	14	14	16	98	98	97	98	97	98	98	99	100	-	T12	T10	T8	T6
39	SS	98	97	106	108	106	106	90	87	YES	NO	16	16	16	16	16	16	14	14	98	99	99	98	99	99	99	98	98	-	T12	T8	T8	T6
40	HK	99	99	90	92	87	87	85	YES	YES	18	18	18	18	16	16	14	14	12	100	99	98	98	98	99	99	100	100	-	T8	T6	T4	T4
41	HS	86	89	85	80	87	87	89	YES	NO	16	16	16	16	16	16	14	14	14	96	97	97	97	97	97	98	97	98	-	T12	T10	T8	T6
42	T	101	84	85	84	92	96	99	YES	NO	16	16	14	16	16	16	16	16	18	98	98	100	100	100	100	100	98	97	-	T12	T8	T6	T6
43	PS	102	93	90	95	97	92	87	NO	NO	16	18	18	18	16	16	14	14	16	98	99	98	97	96	97	98	98	99	-	T12	T12	T8	T8
44	RR	83	76	89	78	100	90	97	NO	NO	14	14	16	14	16	16	16	16	14	100	100	100	100	100	100	100	98	98	-	T8	T6	T4	T4
45	VK	75	85	89	94	90	89	87	NO	YES	16	16	14	18	18	18	16	18	16	98	98	97	96	95	96	97	97	97	-	T8	T6	T6	T6
46	CK	92	100	91	104	97	106	90	NO	NO	18	20	18	20	20	20	18	18	16	96	94	93	94	95	95	96	98	97	-	T10	T8	T8	T8
47	JS	112	108	108	97	90	97	93	NO	NO	16	18	18	18	18	16	16	18	16	100	98	99	98	99	98	99	98	99	-	T12	T10	T10	T8
48	AR	87	86	88	87	91	89	90	YES	NO	16	16	18	18	18	16	16	18	16	98	99	98	97	96	95	97	98	99	-	T10	T8	T6	T6
49	GS	84	91	84	90	99	101	98	NO	NO	16	16	16	16	16	16	14	16	14	99	98	97	97	97	98	97	98	99	-	L1	T10	T12	T8
50	SS	73	93	91	89	95	106	97	YES	YES	16	16	16	16	16	16	16	16	16	100	100	100	100	100	100	100	100	100	-	T12	T6	T4	T4
51	HS	85	73	74	94	98	77	85	NO	YES	16	16	16	16	16	16	16	16	18	100	100	100	100	100	100	100	100	100	-	T10	T8	T6	T6
52	A	75	80	81	83	91	90	88	NO	NO	16	16	18	14	14	14	16	16	14	100	100	100	100	98	99	98	98	100	-	T10	T8	T4	T4
53	GS	85	79	77	74	60	81	82	YES	NO	16	16	16	18	16	18	18	16	16	98	98	98	99	97	100	98	98	98	-	T8	T6	T4	T4
54	KK	86	92	93	91	96	105	103	NO	NO	18	18	18	16	18	18	18	16	18	98	98	96	98	99	99	99	98	98	-	T8	T6	T6	T6
55	GS	65	73	76	83	87	91	93	YES	YES	16	16	16	18	16	18	18	18	16	100	98	96	98	98	97	98	96	98	-	T8	T8	T8	T8
56	SK	60	80	88	83	83	86	90	YES	YES	16	16	16	16	16	16	16	16	16	97	98	97	98	97	98	97	98	98	-	T8	T6	T4	T4
57	SK	72	87	92	93	95	97	93	YES	YES	16	16	16	18	18	16	18	18	16	100	98	96	96	98	97	98	97	98	-	T8	T6	T6	T6
58	BS	95	85	90	97	91	89	85	NO	NO	16	16	16	18	16	18	18	16	16	97	98	97	98	97	98	97	98	97	-	T12	T10	T8	T6
59	TS	60	70	76	83	87	91	93	YES	YES	16	18	16	16	15	14	12	14	14	98	98	98	98	98	98	98	98	100	-	T8	T8	T6	T6
60	AKG	78	78	76	83	85	85	87	NO	NO	14	14	16	14	14	16	14	14	14	98	97	96	97	97	96	97	96	97	-	T12	T10	T8	T8
61	NK	59	63	74	80	86	87	85	YES	YES	14	14	16	16	18	16	16	18	16	98	97	96	97	96	97	96	97	96	-	T10	T8	T8	T8
62	PS	83	83	63	89	95	100	94	NO	YES	14	14	14	16	16	18	18	16	16	98	97	96	97	97	96	97	97	96	-	T12	T12	T10	T8
63	AS	69	83	89	93	96	93	89	NO	YES	14	14	16	14	16	14	14	16	18	97	97	98	97	97	98	97	97	98	-	T12	T6	T4	T4

Sr. No	INITIALS	SENSORY BLOCK_45	SENSORY BLOCK_60	SENSORY BLOCK_75	SENSORY BLOCK_90	Time of onset of sensory block	Highest level of sensory block	Time to attain highest level of sensory block	Time of 2 segment regression from max block ht	BROMAGE SCORE_0 Mins	BROMAGE SCORE_5	BROMAGE SCORE_10	BROMAGE SCORE_15	BROMAGE SCORE_30	BROMAGE SCORE_45	BROMAGE SCORE_60	BROMAGE SCORE_75	BROMAGE SCORE_90	Time To attain Max. Motor Block	POST HR_0 Mins	POST HR_15 Mins	POST HR_30 Mins	POST HR_45 Mins	POST HR_60 Mins	POST HR_2 Hrs	POST HR_3 Hrs
1	P	T6	T6	T10	T12	4	T6	15	66	1	3	3	3	3	3	3	3	2	4	104	106	107	102	100	98	96
2	BS	T8	T10	T12	L1	10	T6	30	35	1	2	3	3	3	3	3	3	2	10	90	88	86	84	82	86	86
3	NS	T6	T8	T12	L1	10	T6	15	50	1	3	3	3	3	3	2	0	-	5	80	84	86	80	82	84	86
4	KS	T8	T10	T12	-	15	T6	30	30	0	1	2	3	3	3	2	1	0	15	82	80	78	82	84	88	82
5	JK	T6	T6	T6	T8	15	T6	30	75	0	1	2	3	3	3	3	3	3	15	68	70	72	74	70	68	72
6	RS	T4	T6	T8	T10	7	T4	30	53	0	3	3	3	3	3	3	3	3	5	76	78	80	78	72	74	78
7	SK	T4	T6	T8	T10	6	T4	30	54	0	2	2	3	3	3	3	3	3	10	84	82	80	84	82	80	78
8	AS	T8	T8	T8	T10	6	T8	6	84	0	1	2	3	3	3	3	3	2	15	82	80	84	86	84	80	78
9	PS	T6	T6	T6	T8	3	T6	10	87	0	3	3	3	3	3	3	3	3	2	84	80	82	80	78	76	78
10	MK	T5	T6	T8	T10	5	T4	15	55	0	2	3	3	3	3	3	3	2	10	72	70	74	78	80	72	76
11	PS	T6	T6	T8	T8	15	T6	30	60	0	2	3	3	3	3	3	3	3	7	100	98	97	96	98	96	94
12	LS	T8	T10	T12	-	5	T8	5	55	0	2	3	3	3	3	3	2	0	8	92	90	92	94	98	100	92
13	GS	T8	T10	T12	-	9	T8	9	51	0	2	3	3	3	3	2	0	-	8	100	98	100	96	94	90	92
14	BS	T8	T10	T10	T12	20	T8	20	40	0	3	3	3	3	3	3	3	2	3	88	84	84	88	90	92	90
15	NS	T4	T4	T6	T8	10	T4	30	65	0	2	3	3	3	3	3	3	3	8	70	72	70	74	76	72	74
16	RPS	T8	T10	T10	T12	5	T6	10	55	0	3	3	3	3	3	3	3	2	2	70	72	74	76	72	68	74
17	DS	T6	T6	T8	T8	3	T6	10	72	0	2	3	3	3	3	3	3	3	7	80	82	84	86	90	84	82
18	SK	T4	T6	T6	T8	6	T4	15	54	0	2	3	3	3	3	3	3	3	6	76	80	82	78	80	84	86
19	JS	T4	T4	T4	T4	15	T4	30	90	0	2	3	3	3	3	3	3	3	10	74	78	80	82	74	76	74
20	T	T6	T8	T10	T12	2	T6	10	58	0	3	3	3	3	3	3	2	1	3	72	74	76	80	82	74	76
21	JS	T6	T8	T8	T10	2	T4	15	43	0	3	3	3	3	3	3	3	2	2	102	100	110	108	106	104	102
22	JS	T6	T6	T6	T8	25	T6	30	65	0	3	3	3	3	3	3	3	3	5	60	80	78	76	74	76	74
23	NK	T6	T6	T8	T8	20	T6	30	55	0	2	3	3	3	3	3	3	3	6	80	78	80	76	80	82	84
24	YK	T6	T6	T8	T8	18	T4	30	57	0	3	3	3	3	3	3	2	3	4	108	110	112	106	108	110	104
25	MS	T10	T10	T12	-	15	T8	15	30	0	1	3	3	3	2	1	1	1	10	102	106	102	108	102	104	108
26	JK	T6	T10	T10	T12	6	T4	15	39	0	3	3	3	3	3	3	3	3	4	60	63	64	66	66	64	62
27	SS	T8	T8	T10	T12	30	T8	30	45	0	1	1	2	3	3	3	2	2	30	88	84	82	86	84	86	84
28	P	T8	T10	T10	T11	13	T8	13	47	0	2	3	3	3	3	3	3	3	10	74	72	70	74	76	76	74
29	GS	T6	T8	T10	T12	9	T4	15	36	0	3	3	3	3	3	3	3	2	5	106	110	110	108	106	110	108
30	D	T8	T10	T12	T12	12	T8	12	48	0	2	3	3	3	3	2	2	2	10	74	68	60	55	54	58	56
31	KS	T8	T8	T8	T10	10	T4	15	30	0	2	3	3	3	3	3	3	2	8	88	92	90	97	98	92	90
32	JS	T6	T6	T6	T6	4	T6	15	116	0	3	3	3	3	3	3	3	3	5	82	84	86	86	88	84	86
33	RB	T6	T8	T8	T8	3	T4	10	57	0	3	3	3	3	3	3	3	2	5	86	86	84	86	88	86	88
34	JK	T4	T4	T4	T6	6	T4	30	84	0	3	3	3	3	3	3	3	3	7	88	90	86	84	86	84	88
35	BS	T8	T8	T8	T8	30	T8	30	90	0	0	0	1	3	3	3	3	3	30	70	70	64	62	60	68	70
36	MK	T4	T6	T8	T8	13	T4	30	47	0	2	3	3	3	3	3	3	3	7	98	95	98	94	92	90	92
37	JS	T6	T8	T10	T12	7	T6	15	53	0	2	3	3	3	3	3	2	1	6	72	74	80	82	80	78	80
38	A	T6	T6	T8	T8	15	T6	30	60	0	1	1	3	3	3	3	3	3	14	98	98	98	100	98	98	98
39	SS	T6	T6	T8	T8	10	T6	30	65	0	3	3	3	3	3	3	3	3	4	70	76	74	76	74	72	70
40	HK	T6	T6	T6	T6	3	T4	15	42	0	2	3	3	3	3	3	3	3	6	84	86	90	88	86	88	90
41	HS	T4	T5	T6	T8	15	T4	30	60	0	1	2	3	3	3	3	3	3	15	74	72	80	84	86	80	84
42	T	T6	T8	T10	T12	9	T6	15	51	0	1	2	3	3	3	3	3	2	15	80	84	86	84	84	86	88
43	PS	T8	T10	T12	-	15	T8	15	45	0	1	2	3	3	3	2	2	2	15	98	98	100	102	100	98	98
44	RR	T4	T6	T8	T10	4	T4	15	56	0	3	3	3	3	3	3	3	3	3	72	74	78	74	70	72	74
45	VK	T6	T8	T10	T12	5	T6	10	55	0	3	3	3	3	3	3	2	2	5	80	84	86	90	82	84	82
46	CK	T8	T8	T10	T12	7	T8	7	68	0	2	3	3	3	3	3	3	3	6	72	70	78	74	76	70	68
47	JS	T4	T6	T8	T10	20	T4	30	40	0	1	1	2	3	3	3	3	3	20	72	74	72	74	80	82	74
48	AR	T8	T8	T8	T10	6	T6	15	39	0	3	3	3	3	3	3	3	3	3	80	82	84	80	78	76	80
49	GS	T8	T8	T8	T10	20	T8	20	70	0	1	3	3	3	3	3	3	3	10	74	80	84	86	82	80	78
50	SS	T4	T6	T8	T8	7	T4	15	53	0	3	3	3	3	3	3	3	3	4	74	84	80	84	86	84	82
51	HS	T6	T8	T8	T10	8	T6	15	52	0	2	3	3	3	3	3	3	2	10	82	80	84	80	78	76	78
52	A	T4	T4	T4	T6	7	T4	15	83	0	2	3	3	3	3	3	3	3	8	80	80	82	80	78	74	78
53	GS	T4	T4	T6	T6	4	T4	15	71	0	2	3	3	3	3	3	3	3	8	84	56	66	86	84	82	80
54	KK	T6	T6	T6	T8	3	T6	5	87	0	2	3	3	3	3	3	3	3	10	106	106	106	106	108	106	106
55	GS	T8	T8	T10	T12	2	T8	2	73	0	3	3	3	3	3	3	3	3	2	88	90	94	94	94	92	90
56	SK	T4	T6	T8	T10	5	T4	15	55	0	3	3	3	3	3	3	3	3	5	78	80	82	98	100	90	80
57	SK	T6	T6	T6	T8	5	T6	10	85	0	3	3	3	3	3	3	3	3	5	70	72	70	78	70	72	74
58	BS	T6	T8	T8	T8	12	T6	30	48	0	1	2	3	3	3	3	3	3	15	80	84	80	84	80	78	76
59	TS	T6	T8	T8	T8	2	T6	15	58	0	3	3	3	3	3	3	3	3	4	72	74	74	76	78	80	80
60	AKG	T10	T12	-	-	15	T8	15	30	0	2	2	3	3	3	3	2	0	15	70	70	72	74	72	70	74
61	NK	T10	T10	T10	T10	10	T8	10	35	0	2	3	3	3	3	3	3	3	9	70	88	90	84	90	90	84
62	PS	T8	T8	T8	T8	20	T8	20	85	0	1	2	2	3	3	3	3	3	20	100	98	96	94	92	90	88
63	AS	T4	T4	T4	T4	6	T4	15	99	0	3	3	3	3	3	3	3	3	3	68	70	72	74	76	72	70

Sr. No	INITIALS	POST HR_4 Hrs	POST HR_5 Hrs	POST HR_6 Hrs	POSTOPT BRADYCARDIA	POST SBP_0 Mins	POST SBP_15 Mins	POST SBP_30 Mins	POST SBP_45 Mins	POST SBP_60 Mins	POST SBP_2 Hrs	POST SBP_3 Hrs	POST SBP_4 Hrs	POST SBP_5 Hrs	POST SBP_6 Hrs	POST DBP_0 Mins	POST DBP_15 Mins	POST DBP_30 Mins	POST DBP_45 Mins	POST DBP_60 Mins	POST DBP_2 Hrs	POST DBP_3 Hrs	POST DBP_4 Hrs	POST DBP_5 Hrs	POST DBP_6 Hrs	POST MAP_0 Mins	POST MAP_15 Mins	POST MAP_30 Mins	POST MAP_45 Mins	POST MAP_60 Mins	POST MAP_2 Hrs	POST MAP_3 Hrs	POST MAP_4 Hrs	POST MAP_5 Hrs	POST MAP_6 Hrs
1	P	94	92	90	YES	114	110	116	120	130	126	128	130	132	136	70	78	80	70	70	60	74	70	74	80	85	89	92	87	90	82	92	90	93	99
2	BS	88	86	84	NO	128	130	128	126	124	120	130	136	134	128	56	60	62	68	70	64	70	70	74	78	80	83	84	87	88	83	90	92	94	95
3	NS	84	82	80	NO	110	112	118	120	130	126	128	130	136	128	70	72	74	70	70	74	76	72	74	76	83	85	89	87	90	91	93	91	95	93
4	KS	84	82	84	NO	116	120	116	112	110	118	114	116	118	120	70	76	78	68	70	72	70	72	74	70	85	91	91	83	83	87	85	87	89	87
5	JK	74	76	72	NO	128	126	128	130	124	120	122	120	124	126	74	80	84	80	72	74	76	80	82	80	92	95	99	97	89	89	91	93	96	95
6	RS	76	78	76	NO	138	140	136	136	134	138	140	132	128	124	88	90	90	88	86	84	82	80	84	86	105	107	105	104	102	102	101	97	99	99
7	SK	76	80	82	YES	130	138	140	140	140	140	140	138	126	120	80	82	84	86	88	90	80	82	80	80	97	101	103	104	105	107	100	101	95	93
8	AS	72	80	92	NO	140	130	138	136	130	134	136	138	140	142	90	88	90	80	84	88	86	84	90	92	107	102	106	99	99	103	103	102	107	109
9	PS	80	82	84	NO	120	130	132	138	136	134	136	130	128	122	80	80	80	86	82	80	74	74	76	80	93	97	97	103	100	98	95	93	93	94
10	MK	74	78	74	NO	124	120	126	130	124	120	124	126	128	130	80	70	74	80	74	78	80	78	74	78	95	87	91	97	91	92	95	94	92	95
11	PS	96	94	96	YES	110	112	110	108	108	114	112	110	118	120	70	68	60	58	60	70	62	70	74	76	83	83	77	75	76	85	79	83	89	91
12	LS	90	94	96	NO	118	120	116	120	122	130	134	136	140	140	66	70	72	74	78	78	80	82	84	86	83	87	87	89	93	95	98	100	103	104
13	GS	93	94	90	NO	128	120	130	130	136	130	120	128	122	128	70	70	70	80	74	80	70	76	72	70	89	87	90	97	95	97	87	93	89	89
14	BS	88	88	86	NO	130	136	130	132	130	128	132	133	136	138	80	90	88	86	82	84	86	88	88	82	97	105	102	101	98	99	101	103	104	101
15	NS	80	76	74	NO	140	130	136	136	132	140	130	128	138	136	82	80	70	76	74	82	86	84	80	90	101	97	92	96	93	101	101	99	99	105
16	RPS	70	72	70	NO	120	110	116	118	116	122	126	120	128	122	70	70	72	74	78	74	78	70	76	72	87	83	87	89	91	90	94	87	93	89
17	DS	80	84	80	NO	140	140	130	134	120	138	134	130	132	136	80	74	70	74	70	74	82	80	84	86	100	96	90	94	87	95	99	97	100	103
18	SK	82	78	84	NO	130	138	132	136	132	128	130	120	134	120	80	86	84	82	84	78	76	74	78	80	97	103	100	100	100	95	94	89	97	93
19	JS	72	80	82	NO	122	124	128	120	130	132	126	128	124	122	74	78	72	70	70	74	76	70	72	70	90	93	91	87	90	93	93	89	89	87
20	T	82	84	86	NO	130	120	126	124	138	130	130	120	124	138	70	80	82	76	78	70	80	84	86	78	90	93	97	92	98	90	97	96	99	98
21	JS	108	110	116	NO	130	120	130	136	130	132	136	140	134	128	70	70	74	78	80	84	86	80	84	86	90	87	93	97	97	100	103	100	101	100
22	JS	76	78	76	NO	130	130	136	140	138	136	140	140	138	136	80	76	78	80	84	86	80	88	84	86	97	94	97	100	102	103	100	105	102	103
23	NK	82	86	84	NO	110	112	116	120	122	120	118	112	110	116	70	76	78	78	74	70	74	72	70	74	83	88	91	92	90	87	89	85	83	88
24	YK	102	100	100	NO	124	120	130	130	126	120	130	130	124	120	78	70	70	80	74	70	80	70	78	70	93	87	90	97	91	87	97	90	93	87
25	MS	102	100	100	NO	132	140	138	132	130	130	134	138	132	140	84	90	92	84	80	70	84	86	82	90	100	107	107	100	97	90	101	103	99	107
26	JK	60	62	64	NO	118	118	120	100	110	112	116	120	118	108	60	70	70	50	70	72	70	70	68	70	79	86	87	67	83	85	85	87	85	83
27	SS	80	82	80	NO	110	120	122	124	120	124	110	116	118	120	70	70	72	74	70	80	70	72	74	70	83	87	89	91	87	95	83	87	89	87
28	P	70	74	76	NO	114	110	116	120	90	110	112	120	122	120	60	70	80	70	65	60	68	70	78	70	78	83	92	87	73	77	83	87	93	87
29	GS	104	102	100	NO	130	120	126	130	140	132	130	134	136	140	80	80	74	90	80	84	80	82	84	80	97	93	91	103	100	100	97	99	101	100
30	D	58	60	60	NO	130	132	140	126	128	126	128	120	130	120	80	82	80	74	76	74	80	80	70	97	97	99	100	91	93	91	96	93	90	105
31	KS	88	86	88	NO	138	140	130	140	140	140	140	140	130	120	88	90	88	86	82	80	70	78	80	82	105	107	102	104	101	100	93	99	97	95
32	JS	88	82	80	NO	130	124	132	124	134	130	132	128	130	130	84	76	88	88	86	80	84	70	70	80	99	92	103	100	102	97	100	89	90	97
33	RB	90	88	86	NO	120	118	122	124	130	132	128	120	116	120	70	72	74	78	80	82	78	74	76	78	87	87	90	93	97	99	95	89	89	92
34	JK	90	88	84	NO	108	110	112	116	116	120	118	124	116	120	72	70	72	70	72	80	80	82	80	90	84	83	85	85	87	93	93	96	92	100
35	BS	74	72	70	YES	110	120	108	124	120	122	128	130	126	122	70	70	70	82	70	74	78	70	76	72	83	87	83	96	87	90	95	90	93	89
36	MK	94	90	90	YES	140	140	136	140	140	132	136	134	136	130	86	90	90	80	86	84	82	84	86	82	104	107	105	100	104	100	100	101	103	98
37	JS	78	78	80	NO	120	128	130	132	128	122	130	130	132	120	70	80	80	82	74	76	70	80	74	80	87	96	97	99	92	91	90	97	93	93
38	A	104	108	106	NO	120	130	124	132	130	126	128	122	120	130	80	80	80	70	80	74	72	74	78	70	93	97	95	91	97	91	91	90	92	90
39	SS	74	78	76	YES	138	126	124	120	120	130	130	120	124	138	88	80	80	86	70	70	80	70	86	88	105	95	95	97	87	90	97	87	99	105
40	HK	92	88	90	YES	118	120	130	126	140	138	142	146	138	120	68	70	80	74	80	88	84	86	84	80	85	87	97	91	100	105	103	106	102	93
41	HS	80	78	80	YES	118	120	124	130	124	120	124	118	120	130	74	80	82	80	74	78	80	78	74	70	89	93	96	97	91	92	95	91	89	90
42	T	88	80	82	NO	130	128	130	138	134	132	140	136	130	126	84	86	80	84	86	84	90	70	80	78	99	100	97	102	102	100	107	92	97	94
43	PS	100	102	104	NO	120	130	130	128	130	124	122	128	130	130	70	80	70	80	82	76	80	74	80	70	87	97	90	96	98	92	94	92	97	90
44	RR	70	74	78	NO	130	120	130	140	140	138	134	132	128	140	80	70	80	80	90	86	84	78	70	80	97	87	97	100	107	103	101	96	89	100
45	VK	80	78	80	NO	120	130	126	128	122	120	124	128	128	130	70	80	74	72	74	70	74	74	72	70	87	97	91	91	90	87	91	92	91	90
46	CK	72	74	76	NO	130	120	140	138	136	140	132	140	138	140	70	80	80	90	78	90	78	90	70	90	90	93	100	106	97	107	96	107	93	107
47	JS	72	74	76	NO	132	130	130	128	124	120	130	130	128	124	74	90	80	74	72	70	70	80	74	72	93	103	97	92	89	87	90	97	92	89
48	AR	82	84	80	NO	130	124	130	128	136	138	130	134	136	130	70	80	80	80	84	90	82	84	86	80	90	95	97	96	101	106	98	101	103	97
49	GS	76	74	76	NO	138	130	140	138	132	136	138	140	130	120	78	80	80	78	72	70	80	70	70	80	98	97	100	98	92	92	99	93	90	93
50	SS	80	84	80	NO	130	140	140	130	138	136	130	130	120	124	80	84	80	70	72	74	70	80	80	84	97	103	100	90	94	95	90	97	93	97
51	HS	78	76	80	NO	116	114	112	116	122	120	122	114	120	122	70	74	60	70	80	80	88	74	80	80	85	87	77	85	94	93	99	87	93	94
52	A	80	82	84	NO	116	120	116	122	126	114	112	120	116	114	74	80	70	88	74	74	60	80	70	74	88	93	85	99	91	87	77	93	85	87
53	GS	82	84	82	YES	120	116	124	124	126	128	130	128	130	126	56	68	62	62	64	68	70	68	64	68	77	84	83	83	85	88	90	88	86	87
54	KK	106	104	104	NO	130	136	124	128	128	126	124	126	128	130	88	86	90	88	86	84	86	88	84	88	102	103	101	101	100	98	99	101	99	102
55	GS	88	90	90	YES	120	116	118	120	126	128	124	120	128	130	80	70	74	80	74	76	74	80	76	80	93	85	89	93	91	93	91	93	93	97
56	SK	84	84	86	NO	114	118	130	130	124	128	124	126	128	130	78	80	70	80	70	78	74	78	78	80	90	93	90	97	88	95	91	94	95	97
57	SK	72	74	72	NO	128	126	130	128	124	128	120	120	130	128	76	78	80	80	60	70	70	80	80	76	93	94	97	96	81	89	87	93	97	93
58	BS	76	78	80	NO	130	130	128	124	126	116	126	116	118	128	70	80	78	74	70	70	80	70	72	70	90	97	95	91	89	85	95	85	87	89
59	TS	82	80	80	NO	120	126	120	118	116	118	120	126	120	126	80	80	70	70	78	74	78	80	80	80	93	95	87	86	91	89	92	95	93	95
60	AKG	76	74	70	NO	120	128	120	132	140	140	120	114	116	120	70	76	76	78	70	80	70	68	70	70	87	93	91	96	93	100	87	83	85	87
61	NK	74	70	70	NO	118	120	126	118	114	116	116	114	116	120	68	70	72	70	68	62	68	66	66	82	85	87	90	86	83	80	84	82	83	95
62	PS	88	90	88	NO	122	116	120	120	118	114	130	130	130	130	80	66	80	70	70	66	70	80	78	80	94	83	93	87	86	82	90	97	95	97
63	AS	74	68	70	NO	126	130	132	138	140	140	136	134	132	130	70	60	70	70	80	90	84	86	82	80	89	83	91	93	100	107	101	102	99	97

Sr. No	INITIALS	POSTOPT HYPOTENSION	POST RR_0 Mins	POST RR_15 Mins	POST RR_30 Mins	POST RR_45 Mins	POST RR_60 Mins	POST RR_2 Hrs	POST RR_3 Hrs	POST RR_4 Hrs	POST RR_5 Hrs	POST RR_6 Hrs	POST SPO2_0 Mins	POST SPO2_15 Mins	POST SPO2_30 Mins	POST SPO2_45 Mins	POST SPO2_60 Mins	POST SPO2_2 Hrs	POST SPO2_3 Hrs	POST SPO2_4 Hrs	POST SPO2_5 Hrs	POST SPO2_6 Hrs	POST VAS_0 Mins	POST VAS_15 Mins	POST VAS_30 Mins	POST VAS_45 Mins	POST VAS_60 Mins	POST VAS_90 Mins	POST VAS_120 Mins	POST VAS_150 Mins	POST VAS_3 Hrs	POST VAS_4 Hrs	POST VAS_5 Hrs	POST VAS_6 Hrs	Time of 1st analgesia postoperatively
1	P	YES	14	14	14	16	16	14	14	12	14	16	100	98	97	96	97	96	97	96	97	97	0	0	0	2	3	5	-	-	-	-	-	-	90
2	BS	NO	16	16	14	12	14	14	16	14	14	16	100	100	98	96	98	97	98	97	98	96	0	0	0	0	1	2	3	4	-	-	-	-	150
3	NS	NO	16	16	16	14	14	14	14	12	12	12	100	100	99	98	99	99	99	98	98	98	0	0	0	0	1	2	3	4	-	-	-	-	150
4	KS	NO	14	14	14	14	16	14	14	16	14	14	98	98	97	96	97	98	97	98	97	98	0	0	1	3	4	-	-	-	-	-	-	-	60
5	JK	NO	14	14	16	16	18	14	12	12	12	14	98	97	98	97	98	97	96	97	98	99	0	0	0	0	1	1	2	3	4	-	-	-	180
6	RS	NO	14	14	12	12	14	14	14	14	12	12	98	98	99	97	96	97	98	99	98	97	0	0	0	0	0	0	1	1	2	2	3	4	360
7	SK	NO	14	14	14	16	16	14	14	12	12	12	97	98	97	98	97	98	97	98	97	98	0	0	0	0	0	0	0	1	2	3	5	-	300
8	AS	NO	12	12	16	14	14	16	14	14	14	16	97	98	97	98	97	98	97	96	97	98	0	0	0	0	1	2	3	3	4	-	-	-	180
9	PS	NO	14	14	12	12	12	12	14	14	12	12	98	97	98	97	98	97	98	97	98	97	0	1	3	4	-	-	-	-	-	-	-	-	45
10	MK	NO	14	14	16	12	14	12	14	12	12	14	98	98	97	98	97	98	98	97	98	98	0	0	0	0	0	1	3	4	-	-	-	-	150
11	PS	NO	14	14	14	12	12	16	14	14	12	12	98	97	96	95	97	96	98	98	99	98	0	0	0	0	0	1	1	2	2	3	4	-	300
12	LS	NO	12	12	14	14	14	16	16	18	14	12	98	98	97	96	97	96	96	97	98	99	0	0	1	2	3	4	-	-	-	-	-	-	90
13	GS	NO	14	14	14	14	14	12	12	12	12	12	97	97	97	97	97	98	98	98	98	97	0	0	0	0	0	0	0	0	1	2	4	4	360
14	BS	NO	14	14	14	12	14	14	14	12	14	12	98	97	98	97	96	97	97	96	97	96	0	0	0	0	0	0	1	2	3	4	-	-	240
15	NS	NO	14	14	14	14	12	12	12	12	12	12	98	98	98	98	97	96	98	98	98	98	0	0	0	0	0	1	1	2	2	3	4	-	300
16	RPS	NO	14	14	14	12	12	12	12	12	12	12	99	98	97	98	99	97	98	97	98	97	0	0	0	0	0	0	1	3	4	-	-	-	180
17	DS	NO	16	14	14	14	14	12	12	12	12	12	99	98	98	99	100	100	99	99	100	100	0	0	0	0	0	1	2	2	3	3	4	-	300
18	SK	NO	16	16	16	14	14	16	14	14	14	12	99	98	99	98	98	99	98	98	99	98	0	0	0	0	1	2	3	3	4	-	-	-	180
19	JS	NO	14	16	16	16	14	14	14	12	12	12	98	99	98	99	98	97	98	98	99	98	0	0	0	0	1	2	2	3	3	4	-	-	240
20	T	NO	16	16	14	14	14	14	12	12	12	12	100	98	99	98	99	99	98	99	98	97	0	0	0	0	0	1	1	2	2	3	4	-	300
21	JS	NO	16	16	16	16	14	14	14	14	14	14	99	98	99	98	100	98	99	98	99	98	0	0	0	1	1	1	2	2	3	4	-	-	240
22	JS	NO	16	16	16	16	16	16	16	16	16	16	99	98	98	99	98	99	99	99	98	99	0	0	0	-	0	0	0	0	1	2	3	4	360
23	NK	NO	16	16	16	16	16	16	14	14	14	14	98	99	98	98	99	96	97	98	98	98	0	0	0	0	0	0	0	0	0	0	0	0	540
24	YK	NO	14	14	14	14	12	12	12	12	12	12	97	98	98	98	98	98	99	97	97	97	0	2	4	-	-	-	-	-	-	-	-	-	30
25	MS	NO	16	16	14	14	14	14	12	12	12	12	99	98	99	98	99	98	99	98	99	99	0	0	0	0	0	0	0	1	2	3	4	-	360
26	JK	YES	12	12	14	12	12	14	14	12	12	12	97	96	97	96	97	97	97	96	96	97	0	0	0	0	0	0	0	1	2	3	4	-	300
27	SS	NO	12	12	14	14	12	12	12	14	12	12	98	97	96	97	98	98	98	99	98	98	0	0	0	0	0	0	0	1	1	2	3	4	360
28	P	YES	12	12	14	14	12	12	12	14	12	14	100	98	97	98	97	98	97	98	98	99	0	0	0	0	0	0	0	0	0	0	2	3	420
29	GS	NO	14	14	14	12	12	12	14	14	12	12	97	98	97	98	97	98	97	98	97	98	0	0	0	0	0	0	1	2	3	4	-	-	240
30	D	NO	14	14	16	16	16	18	18	16	14	12	97	97	98	97	98	97	96	97	98	99	2	3	4	-	-	-	-	-	-	-	-	-	30
31	KS	NO	14	14	14	12	12	14	14	14	14	12	100	98	97	96	97	98	97	98	97	98	0	0	0	0	0	0	0	1	2	4	-	-	240
32	JS	NO	14	16	16	16	16	14	14	12	12	12	97	98	98	98	98	97	98	99	98	97	0	0	0	0	0	0	1	1	2	2	3	4	360
33	RB	NO	14	14	12	14	14	12	12	14	14	12	98	98	98	97	96	97	98	98	99	98	0	0	0	0	0	1	2	2	3	4	-	-	240
34	JK	NO	14	14	14	12	12	12	12	12	12	12	98	98	98	99	100	100	100	99	98	99	0	0	0	0	0	0	0	0	1	2	3	4	360
35	BS	NO	16	16	16	16	16	14	14	14	14	14	96	97	98	97	98	97	97	97	96	97	0	0	0	0	0	0	0	1	2	3	4	-	300
36	MK	NO	12	16	16	14	14	12	12	12	12	12	96	96	96	98	97	98	97	97	98	98	0	0	0	0	0	0	0	0	2	4	-	-	240
37	JS	NO	14	14	14	14	12	12	12	12	12	12	98	98	99	99	98	100	100	98	99	98	0	0	0	0	0	0	0	0	2	3	4	-	300
38	A	NO	16	16	16	16	14	14	12	12	12	12	100	98	98	97	98	98	97	98	97	98	0	0	0	0	0	0	0	0	1	2	3	4	360
39	SS	NO	16	16	16	16	14	14	14	14	14	14	99	100	100	100	98	98	99	98	99	99	0	0	0	0	0	0	0	1	2	3	4	-	300
40	HK	NO	12	12	14	12	12	14	14	12	12	12	100	98	97	96	97	98	97	98	99	100	0	0	0	0	1	2	3	4	-	-	-	-	150
41	HS	NO	14	14	12	12	12	12	12	12	12	12	98	98	97	98	99	98	99	98	99	98	0	0	0	0	0	0	1	2	4	-	-	-	180
42	T	NO	18	16	16	14	14	12	12	12	12	12	97	98	97	98	99	98	99	100	98	99	0	0	0	0	0	1	2	3	4	-	-	-	180
43	PS	NO	16	16	14	14	14	14	12	12	12	12	98	99	98	98	97	98	97	98	99	100	0	0	0	0	0	0	1	2	3	4	-	-	180
44	RR	NO	14	14	14	14	14	14	14	14	12	12	98	99	98	98	97	99	98	98	97	98	0	0	0	0	0	0	1	2	3	4	-	-	180
45	VK	NO	16	14	14	14	16	14	12	12	12	12	97	98	98	99	98	97	98	97	98	98	0	0	0	0	0	0	0	1	2	3	4	-	240
46	CK	NO	16	16	16	16	16	14	14	12	12	12	97	98	99	97	98	97	98	97	98	99	0	0	0	0	0	0	0	0	1	2	3	4	300
47	JS	NO	16	16	14	14	14	14	12	12	12	12	99	98	99	99	98	97	98	98	98	98	0	0	0	0	0	1	2	2	3	4	-	-	240
48	AR	NO	16	18	18	16	16	14	14	12	12	12	99	98	97	98	99	98	97	98	99	98	0	0	0	0	0	0	0	0	1	2	3	4	360
49	GS	NO	14	16	16	14	14	14	12	12	12	12	98	99	98	99	98	99	99	98	98	98	0	0	0	0	0	0	2	4	-	-	-	-	150
50	SS	NO	16	16	14	14	14	12	12	12	12	12	100	100	98	98	99	99	99	98	98	99	0	0	0	0	1	2	3	3	4	-	-	-	180
51	HS	NO	18	18	16	16	16	16	14	14	14	14	100	100	98	99	98	97	98	96	97	98	0	0	0	0	0	0	0	0	0	2	3	3	420
52	A	NO	14	16	16	14	16	14	14	14	14	14	100	100	98	98	100	98	94	98	100	100	0	0	0	0	0	0	0	1	1	2	2	3	420
53	GS	NO	16	16	16	18	18	18	18	16	18	18	98	98	98	99	98	98	98	98	98	98	0	0	0	0	0	0	0	1	2	3	4	-	300
54	KK	NO	16	18	18	18	18	18	18	18	18	18	98	98	97	98	98	97	96	97	98	97	0	0	0	0	0	0	0	0	1	2	3	4	360
55	GS	NO	16	18	16	16	16	16	18	16	16	16	98	96	97	98	97	98	98	98	96	98	0	0	0	0	0	0	0	0	2	2	3	4	360
56	SK	NO	16	16	18	16	18	18	16	16	16	18	98	97	97	98	98	96	98	96	98	98	0	0	0	3	5	-	-	-	-	-	-	-	60
57	SK	NO	16	16	16	18	16	16	18	18	16	18	98	98	98	97	96	97	96	97	98	97	0	0	0	0	0	0	0	1	2	2	3	4	360
58	BS	NO	16	18	16	16	16	18	16	16	18	18	97	97	98	97	98	98	97	98	97	98	0	0	0	0	0	0	0	0	3	3	5	-	300
59	TS	NO	14	14	14	14	14	14	14	14	16	14	100	100	100	100	98	98	98	98	98	98	0	0	0	0	0	0	0	1	1	2	2	3	420
60	AKG	NO	14	14	14	14	14	14	14	16	14	16	97	97	97	98	98	98	98	97	96	97	0	0	0	0	0	0	1	2	3	4	-	-	240
61	NK	NO	16	16	14	14	14	14	14	14	14	14	96	97	98	98	97	98	98	98	98	98	0	0	0	0	0	0	0	1	1	2	2	3	420
62	PS	NO	16	16	16	16	18	16	14	14	14	14	96	97	96	96	97	97	97	96	97	96	0	0	0	1	1	1	2	2	2	3	3	4	360
63	AS	NO	18	16	16	14	14	12	14	14	14	12	98	98	97	96	97	97	97	98	99	98	0	0	0	0	0	1	2	2	2	3	3	3	420

Sr. No	INITIALS	POST SENSORY BLOCK_0 Mins	POST SENSORY BLOCK_15 Mins	POST SENSORY BLOCK_30 Mins	POST SENSORY BLOCK_45 Mins	POST SENSORY BLOCK_60 Mins	POST SENSORY BLOCK_90 Mins	POST SENSORY BLOCK_120 Mins	POST SENSORY BLOCK_150 Mins	POST SENSORY BLOCK_3 Hrs	POST SENSORY BLOCK_4 Hrs	POST SENSORY BLOCK_5 Hrs	POST SENSORY BLOCK_6 Hrs	Time of regression to segment T12	POST MOTOR BLOCK_0 Mins	POST MOTOR BLOCK_15 Mins	POST MOTOR BLOCK_30 Mins	POST MOTOR BLOCK_45 Mins	POST MOTOR BLOCK_60 Mins	POST MOTOR BLOCK_90 Mins	POST MOTOR BLOCK_120 Mins	POST MOTOR BLOCK_150 Mins	POST MOTOR BLOCK_3 Hrs	POST MOTOR BLOCK_4 Hrs	POST MOTOR BLOCK_5 Hrs	POST MOTOR BLOCK_6 Hrs	Time Unitill Full Recovery Of Motor Function (Mins)
1	P	T12	-	-	-	-	-	-	-	-	-	-	-	86	1	0	0	-	-	-	-	-	-	-	-	-	101
2	BS	L1	-	-	-	-	-	-	-	-	-	-	-	65	2	1	0	-	-	-	-	-	-	-	-	-	110
3	NS	L1	-	-	-	-	-	-	-	-	-	-	-	65	0	-	-	-	-	-	-	-	-	-	-	-	70
4	KS	L1	-	-	-	-	-	-	-	-	-	-	-	45	0	-	-	-	-	-	-	-	-	-	-	-	75
5	JK	T8	T10	T12	-	-	-	-	-	-	-	-	-	95	3	3	2	1	0	-	-	-	-	-	-	-	135
6	RS	T10	T10	T12	-	-	-	-	-	-	-	-	-	113	3	3	2	1	0	-	-	-	-	-	-	-	145
7	SK	T10	T10	T10	T12	-	-	-	-	-	-	-	-	129	3	2	1	0	-	-	-	-	-	-	-	-	125
8	AS	T10	T12	-	-	-	-	-	-	-	-	-	-	99	2	1	0	0	-	-	-	-	-	-	-	-	105
9	PS	T8	T10	T12	-	-	-	-	-	-	-	-	-	132	3	2	1	0	-	-	-	-	-	-	-	-	133
10	MK	T10	T12	-	-	-	-	-	-	-	-	-	-	100	2	2	1	0	-	-	-	-	-	-	-	-	125
11	PS	T8	T10	T10	T12	-	-	-	-	-	-	-	-	120	3	3	2	2	1	0	-	-	-	-	-	-	173
12	LS	T12	-	-	-	-	-	-	-	-	-	-	-	70	0	-	-	-	-	-	-	-	-	-	-	-	82
13	GS	L1	-	-	-	-	-	-	-	-	-	-	-	66	0	-	-	-	-	-	-	-	-	-	-	-	67
14	BS	T12	-	-	-	-	-	-	-	-	-	-	-	70	2	1	0	-	-	-	-	-	-	-	-	-	117
15	NS	T8	T8	T10	T12	-	-	-	-	-	-	-	-	125	3	3	3	2	1	0	-	-	-	-	-	-	172
16	RPS	T12	-	-	-	-	-	-	-	-	-	-	-	85	2	1	0	-	-	-	-	-	-	-	-	-	118
17	DS	T8	T10	T12	-	-	-	-	-	-	-	-	-	117	3	3	3	2	1	0	-	-	-	-	-	-	173
18	SK	T8	T10	T12	-	-	-	-	-	-	-	-	-	114	3	2	1	0	-	-	-	-	-	-	-	-	129
19	JS	T4	T6	T10	T12	-	-	-	-	-	-	-	-	120	3	3	2	1	0	-	-	-	-	-	-	-	140
20	T	T12	-	-	-	-	-	-	-	-	-	-	-	88	1	0	-	-	-	-	-	-	-	-	-	-	102
21	JS	T10	T12	-	-	-	-	-	-	-	-	-	-	103	2	1	0	-	-	-	-	-	-	-	-	-	118
22	JS	T8	T10	T12	-	-	-	-	-	-	-	-	-	95	3	2	1	0	-	-	-	-	-	-	-	-	130
23	NK	T8	T10	T12	-	-	-	-	-	-	-	-	-	100	3	3	3	3	2	1	0	-	-	-	-	-	204
24	YK	T8	T10	T12	-	-	-	-	-	-	-	-	-	132	3	2	1	0	-	-	-	-	-	-	-	-	131
25	MS	T12	-	-	-	-	-	-	-	-	-	-	-	60	1	1	1	1	1	1	0	-	-	-	-	-	200
26	JK	T12	-	-	-	-	-	-	-	-	-	-	-	84	3	2	1	0	-	-	-	-	-	-	-	-	131
27	SS	T12	-	-	-	-	-	-	-	-	-	-	-	60	2	1	0	-	-	-	-	-	-	-	-	-	90
28	P	T12	-	-	-	-	-	-	-	-	-	-	-	87	3	3	3	2	1	0	-	-	-	-	-	-	170
29	GS	T12	-	-	-	-	-	-	-	-	-	-	-	81	2	1	0	-	-	-	-	-	-	-	-	-	115
30	D	T12	-	-	-	-	-	-	-	-	-	-	-	63	2	2	1	0	-	-	-	-	-	-	-	-	125
31	KS	T10	T12	-	-	-	-	-	-	-	-	-	-	95	2	1	0	-	-	-	-	-	-	-	-	-	112
32	JS	T6	T6	T8	T10	T12	-	-	-	-	-	-	-	146	3	3	1	0	-	-	-	-	-	-	-	-	145
33	RB	T8	T10	T10	T12	-	-	-	-	-	-	-	-	132	2	1	0	-	-	-	-	-	-	-	-	-	115
34	JK	T6	T8	T10	T12	-	-	-	-	-	-	-	-	129	3	3	2	1	0	-	-	-	-	-	-	-	143
35	BS	T8	T8	T10	T12	-	-	-	-	-	-	-	-	105	3	3	3	3	3	2	1	0	-	-	-	-	210
36	MK	T8	T10	T12	-	-	-	-	-	-	-	-	-	107	3	2	1	0	-	-	-	-	-	-	-	-	128
37	JS	T12	-	-	-	-	-	-	-	-	-	-	-	83	1	0	-	-	-	-	-	-	-	-	-	-	99
38	A	T8	T8	T8	T8	T10	T12	-	-	-	-	-	-	165	3	2	1	1	0	-	-	-	-	-	-	-	136
39	SS	T6	T6	T6	T8	T10	T12	-	-	-	-	-	-	170	3	2	2	2	1	0	-	-	-	-	-	-	176
40	HK	T6	T8	T10	T10	T12	-	-	-	-	-	-	-	147	3	3	3	2	1	0	-	-	-	-	-	-	174
41	HS	T8	T10	T12	-	-	-	-	-	-	-	-	-	105	3	2	1	0	-	-	-	-	-	-	-	-	120
42	T	T12	-	-	-	-	-	-	-	-	-	-	-	81	2	1	0	-	-	-	-	-	-	-	-	-	105
43	PS	L1	-	-	-	-	-	-	-	-	-	-	-	60	2	1	0	-	-	-	-	-	-	-	-	-	105
44	RR	T10	T12	-	-	-	-	-	-	-	-	-	-	101	3	3	2	1	0	-	-	-	-	-	-	-	147
45	VK	T12	-	-	-	-	-	-	-	-	-	-	-	85	2	2	1	0	-	-	-	-	-	-	-	-	130
46	CK	T12	-	-	-	-	-	-	-	-	-	-	-	83	3	2	1	0	-	-	-	-	-	-	-	-	129
47	JS	T10	T12	-	-	-	-	-	-	-	-	-	-	85	3	2	1	0	-	-	-	-	-	-	-	-	115
48	AR	T10	T12	-	-	-	-	-	-	-	-	-	-	99	3	3	3	2	1	0	0	0	-	-	-	-	177
49	GS	T10	T12	-	-	-	-	-	-	-	-	-	-	85	3	2	1	0	-	-	-	-	-	-	-	-	125
50	SS	T8	T10	T12	-	-	-	-	-	-	-	-	-	113	3	2	1	0	-	-	-	-	-	-	-	-	131
51	HS	T10	T10	T12	-	-	-	-	-	-	-	-	-	112	2	2	2	1	0	-	-	-	-	-	-	-	140
52	A	T6	T8	T10	T12	-	-	-	-	-	-	-	-	128	3	3	2	1	0	-	-	-	-	-	-	-	142
53	GS	T6	T6	T8	T8	T8	T10	T12	-	-	-	-	-	206	3	3	3	3	2	1	0	-	-	-	-	-	202
54	KK	T8	T8	T10	T10	T10	T12	-	-	-	-	-	-	177	3	3	3	3	3	1	0	-	-	-	-	-	200
55	GS	T12	-	-	-	-	-	-	-	-	-	-	-	88	3	3	2	1	0	-	-	-	-	-	-	-	148
56	SK	T10	T12	-	-	-	-	-	-	-	-	-	-	100	3	2	1	0	-	-	-	-	-	-	-	-	130
57	SK	T8	T8	T10	T12	-	-	-	-	-	-	-	-	130	3	3	2	1	0	-	-	-	-	-	-	-	145
58	BS	T8	T8	T10	T10	T12	-	-	-	-	-	-	-	138	3	3	2	1	0	-	-	-	-	-	-	-	135
59	TS	T8	T8	T8	T10	T10	T10	T12	-	-	-	-	-	208	3	3	3	2	2	2	1	0	-	-	-	-	236
60	AKG	L1	-	-	-	-	-	-	-	-	-	-	-	45	0	-	-	-	-	-	-	-	-	-	-	-	75
61	NK	T10	T10	T12	-	-	-	-	-	-	-	-	-	110	3	3	2	1	0	-	-	-	-	-	-	-	141
62	PS	T8	T10	T12	-	-	-	-	-	-	-	-	-	100	3	3	2	1	0	-	-	-	-	-	-	-	130
63	AS	T4	T6	T8	T12	-	-	-	-	-	-	-	-	129	3	3	3	2	2	1	1	0	-	-	-	-	237

Sr. No	INITIALS	Age	sex	Treatment Group	Admission No.	BMI	COMORBIDITIES	ASA Grade	HR_0 Mins	HR_5	HR_10	HR_15	HR_30	HR_45	HR_60	HR_75	HR_90	SBP_0 Mins	SBP_5	SBP_10	SBP_15	SBP_30	SBP_45	SBP_60	SBP_75	SBP_90	DBP_0 Mins	DBP_5	DBP_10	DBP_15	DBP_30	DBP_45	DBP_60	DBP_75	DBP_90	MAP_0 Mins	MAP_5
64	SPK	42	M	2	805768	28	none	1	110	108	108	106	104	102	104	102	100	130	98	112	108	114	120	126	128	126	80	70	60	60	70	70	72	74	76	97	79
65	RS	50	M	1	777867	24	Gout	2	80	78	86	84	82	80	82	84	82	140	128	104	114	112	116	118	130	140	90	78	68	80	70	68	70	80	90	110	90
66	GS	19	M	1	793452	20	none	1	70	62	56	66	70	72	70	68	70	130	96	82	100	102	110	112	120	130	80	54	48	60	64	70	72	60	70	97	68
67	AKG	20	M	2	161108	20	none	1	86	84	82	82	80	82	84	86	82	120	90	108	116	114	112	110	120	120	70	60	70	70	68	62	70	80	80	87	70
68	SS	22	M	1	236972	22	none	1	70	64	54	60	64	66	68	70	72	120	102	92	100	108	110	120	122	126	78	60	52	60	70	60	70	74	80	92	74
69	JS	24	M	1	202237	22	none	1	88	76	60	68	70	78	80	80	84	114	96	88	102	116	120	114	120	120	60	50	48	60	66	70	66	60	70	78	65
70	BS	34	M	1	802261	24	none	1	76	70	60	64	70	72	78	76	74	130	120	100	108	116	120	126	128	130	78	70	60	64	70	70	74	78	80	95	87
71	VS	35	M	2	815467	22	none	1	88	80	78	52	80	82	84	86	88	130	126	112	108	130	124	122	120	130	80	70	68	60	80	78	70	70	80	97	89
72	JS	26	M	2	805479	24	none	1	70	68	70	72	74	70	74	70	72	120	116	108	110	114	112	116	110	120	80	70	60	70	68	78	70	70	80	93	85
73	SS	60	M	2	809664	24	none	1	90	88	86	84	86	84	82	84	86	130	128	126	102	106	116	110	120	130	80	78	74	60	72	70	70	74	80	97	95
74	MA	18	M	1	807491	22	none	1	94	98	96	96	94	92	94	96	94	128	106	132	114	116	110	120	120	130	80	70	36	52	60	70	70	80	70	96	82
75	RK	69	F	1	820465	28	HTN	2	86	74	80	74	76	78	74	76	60	134	108	102	104	112	110	112	108	108	78	74	54	60	60	70	74	56	54	105	85
76	SS	22	M	1	935599	25	none	1	54	56	56	60	52	56	50	48	50	140	140	130	138	136	138	136	140	140	84	76	74	68	68	66	76	78	86	103	102
77	BK	60	F	1	923787	30	HTN,Obese-I	2	70	74	68	70	64	66	70	62	70	120	106	98	104	100	98	100	100	126	60	66	66	66	60	62	60	62	70	80	80
78	AS	55	M	1	646360	24	none	1	88	80	72	62	64	66	68	68	76	140	140	126	140	140	140	140	140	134	90	80	70	76	78	76	80	82	80	107	100
79	HS	26	M	1	655764	25	none	1	86	80	84	72	78	70	80	78	80	140	126	126	124	118	110	120	130	130	90	78	70	80	68	68	70	70	80	107	99
80	N	28	F	2	686293	21	none	1	120	120	98	100	106	108	100	98	90	120	114	106	108	110	108	106	112	106	98	78	60	66	66	66	60	68	76	105	90
81	S	24	M	2	923815	22	none	1	72	70	74	78	72	74	70	72	72	120	110	116	108	110	120	130	116	118	74	70	72	70	70	70	70	72	74	89	83
82	GS	30	M	2	647486	24	none	1	74	80	68	62	60	62	62	64	82	140	140	140	136	134	132	128	138	140	88	80	88	80	78	90	80	80	76	105	100
83	AS	30	M	2	710296	24	none	1	88	84	86	82	80	88	86	80	84	136	120	106	110	116	120	120	116	120	74	70	60	70	74	78	72	70	72	95	87
84	JS	50	M	1	737310	25	none	1	72	84	86	74	72	64	62	60	64	140	140	130	140	138	140	140	140	140	90	86	90	86	94	90	90	84	80	107	104
85	A	54	F	2	561169	35	obese-II	2	82	98	92	94	92	84	90	86	88	140	140	138	140	134	132	134	130	130	88	80	76	86	80	80	80	80	70	105	100
86	MS	24	M	2	233020	24	none	1	88	84	82	80	84	86	84	86	84	116	90	110	112	118	120	110	112	110	72	60	70	72	74	70	70	72	70	87	70
87	GS	30	M	2	867303	23	none	1	92	100	92	88	78	66	84	90	90	120	118	110	112	108	104	114	120	122	66	56	56	48	50	44	44	48	60	84	76
88	GS	62	M	1	257409	28	HTN	2	52	58	54	54	50	50	52	52	54	138	140	132	140	138	136	130	130	130	72	80	78	80	78	78	70	80	70	105	100
89	VK	26	M	2	236972	23	none	1	106	98	102	102	102	80	92	92	90	140	132	132	130	128	120	126	120	130	90	82	80	80	78	78	82	70	70	107	99
90	PS	50	M	2	755982	19	alcoholic	2	70	74	78	74	76	78	74	70	68	110	90	80	108	98	96	98	100	100	60	58	52	62	66	60	60	68	72	77	79
91	RPS	45	M	1	747594	27	none	1	90	80	76	72	74	72	70	60	70	140	140	120	118	118	116	120	118	116	90	80	70	70	74	68	70	68	70	107	100
92	VK	37	M	1	756656	27	none	1	100	88	84	88	94	98	96	98	82	126	128	130	124	134	120	128	120	122	82	78	78	82	84	88	88	88	86	97	95
93	B	24	F	2	846732	23	none	1	88	84	80	76	78	78	78	78	76	136	126	108	110	108	108	110	120	130	88	70	66	70	68	64	70	70	70	104	89
94	SS	32	M	1	267482	26	none	1	84	80	72	64	60	70	72	74	76	134	120	106	122	100	106	110	112	120	72	68	54	72	50	52	56	60	70	96	85
95	KS	62	M	2	650630	29	none	1	104	108	106	102	102	102	104	104	104	138	124	136	138	136	132	140	130	136	80	72	66	74	74	74	80	70	90	99	89
96	AT	36	F	2	759014	21	none	1	62	60	60	54	52	50	54	54	64	116	108	106	98	96	94	108	90	118	70	60	60	64	60	64	64	62	70	85	76
97	D	29	M	1	946720	24	none	1	70	64	60	66	70	72	70	68	70	116	92	80	108	110	120	110	116	118	70	64	50	60	70	70	70	70	72	85	73
98	NN	40	M	2	758794	31	Obese-I	2	90	88	86	86	86	86	88	84	86	140	140	120	110	112	108	110	120	130	88	90	78	68	68	68	70	70	70	108	106
99	YM	49	M	1	941125	25	none	1	80	78	74	76	74	76	78	74	78	134	128	130	120	126	120	122	132	130	80	74	70	70	72	70	72	82	70	98	92
100	MS	24	M	1	943809	24	none	1	78	76	74	64	70	72	70	66	64	140	138	136	134	108	116	116	128	126	86	86	80	78	68	60	56	62	66	104	103

Sr. No	INITIALS	MAP_10	MAP_15	MAP_30	MAP_45	MAP_60	MAP_75	MAP_90	BRADYCARDIA	HYPOTENSION	RR_0 Mins	RR_5	RR_10	RR_15	RR_30	RR_45	RR_60	RR_75	RR_90	SPO2_0 Mins	SPO2_5	SPO2_10	SPO2_15	SPO2_30	SPO2_45	SPO2_60	SPO2_75	SPO2_90	SENSORY BLOCK_0 Mins	SENSORY BLOCK_5	SENSORY BLOCK_10	SENSORY BLOCK_15	SENSORY BLOCK_30
64	SPK	77	76	85	87	90	92	93	NO	YES	14	14	16	18	16	16	18	18	18	97	97	98	97	97	96	97	96	96	-	T10	T8	T8	T8
65	RS	80	91	84	84	86	97	107	NO	YES	14	14	16	16	18	18	16	18	18	98	97	96	95	96	97	97	98	98	-	T8	T6	T4	T4
66	GS	59	73	77	83	85	80	90	NO	YES	14	14	16	18	18	16	18	16	14	97	96	95	96	97	97	98	97	98	-	T8	T6	T6	T6
67	AKG	83	85	83	79	83	93	93	NO	YES	14	14	14	16	16	18	14	14	14	98	97	98	97	96	97	98	97	96	-	T12	T10	T8	T6
68	SS	65	73	83	77	87	90	95	YES	YES	14	16	18	18	18	16	16	16	14	97	96	96	96	97	98	100	98	98	-	T8	T8	T8	T8
69	JS	61	74	83	87	82	80	87	YES	YES	16	14	14	14	16	16	18	16	14	98	98	99	98	98	97	96	97	98	-	T8	T8	T8	T8
70	BS	73	79	85	87	91	95	97	YES	YES	14	14	16	16	18	18	14	16	14	98	97	97	98	97	97	98	97	98	-	T8	T8	T8	T8
71	VS	83	76	97	93	87	87	97	YES	NO	14	14	16	14	14	16	16	18	16	97	98	99	98	98	99	98	99	100	-	T10	T8	T6	T4
72	JS	76	83	83	89	85	83	93	NO	NO	14	14	14	16	16	18	14	16	14	98	97	97	98	97	98	97	98	97	-	T12	T10	T8	T6
73	SS	91	74	83	85	83	89	97	NO	YES	14	14	14	14	14	16	16	14	14	100	98	97	98	97	96	97	98	99	-	T12	T12	T10	T8
74	MA	68	73	79	83	87	93	90	NO	NO	14	14	16	16	18	18	16	14	12	98	97	96	97	98	97	96	97	96	-	T8	T8	T8	T6
75	RK	75	75	78	83	86	72	72	YES	YES	14	14	16	16	16	16	16	18	18	100	98	97	98	98	98	98	99	99	-	T8	T6	T6	T6
76	SS	99	90	91	90	104	107	112	NO	NO	16	16	16	16	18	18	16	16	16	99	98	98	98	100	97	98	98	100	-	T10	T4	T4	T4
77	BK	77	79	73	74	73	75	89	NO	NO	16	18	16	16	16	18	18	20	16	100	98	99	99	99	100	98	99	98	-	T6	T6	T6	T6
78	AS	89	97	99	99	100	101	107	YES	NO	16	16	18	18	18	18	16	16	16	100	98	99	98	98	99	98	99	99	-	T8	T6	T6	T6
79	HS	97	98	90	87	87	90	97	NO	YES	16	16	16	16	16	16	16	16	16	98	97	97	98	100	100	99	98	99	-	T12	T6	T4	T4
80	N	75	80	82	82	75	84	84	YES	NO	16	16	16	16	16	16	16	18	18	100	100	98	99	99	98	98	97	97	-	T8	T6	T6	T6
81	S	87	83	83	87	90	87	89	NO	NO	16	14	16	14	14	12	14	14	14	98	97	98	96	97	98	99	98	98	-	T8	T6	T6	T6
82	GS	105	99	96	104	102	102	98	NO	NO	16	18	18	18	18	18	18	18	16	100	100	100	100	100	100	99	100	98	-	T10	T8	T6	T6
83	AS	75	83	88	92	88	85	88	NO	YES	16	14	16	16	16	14	14	14	14	98	99	98	98	98	99	98	99	98	-	T10	T8	T6	T6
84	JS	103	104	114	107	107	103	100	NO	NO	16	16	16	16	16	16	16	16	16	98	99	99	97	96	97	96	95	97	-	T8	T8	T6	T6
85	A	102	104	106	103	103	97	90	NO	NO	16	16	16	16	16	16	16	16	14	97	100	97	99	100	98	97	98	98	-	T12	T10	T8	T8
86	MS	83	85	89	87	83	85	83	NO	YES	14	16	16	16	16	16	16	16	16	96	99	97	96	97	98	96	97	96	-	T12	T10	T8	T6
87	GS	76	75	90	68	71	75	81	YES	NO	16	16	16	16	16	16	16	16	16	99	100	100	98	100	99	100	99	99	-	T10	T8	T8	T8
88	GS	99	111	109	108	90	97	90	NO	NO	16	16	16	16	16	16	16	16	16	98	98	98	98	100	100	99	98	98	-	T12	T10	T8	T8
89	VK	97	97	95	92	99	87	90	YES	NO	16	16	16	16	16	16	16	16	16	100	100	100	98	99	99	100	100	99	-	T12	T10	T8	T8
90	PS	61	77	77	72	73	79	81	NO	YES	16	16	18	16	18	16	16	16	16	95	95	95	96	96	98	96	96	96	-	T8	T4	T4	T4
91	RPS	87	86	89	84	87	85	85	YES	NO	16	16	16	16	16	16	16	16	16	100	100	100	100	100	100	98	98	98	-	T8	T8	T6	T6
92	VK	95	94	106	102	103	103	101	NO	NO	16	16	16	16	16	16	16	16	16	100	100	100	100	100	100	100	100	100	-	T10	T8	T8	T6
93	B	80	83	80	79	83	87	90	NO	YES	16	16	16	16	16	16	16	16	16	98	98	98	98	98	98	98	98	98	-	T10	T6	T6	T4
94	SS	76	96	70	72	75	77	87	YES	YES	16	16	16	16	16	18	16	16	16	100	100	98	98	98	98	99	98	98	-	T10	T8	T6	T6
95	KS	89	95	95	98	104	90	105	NO	NO	16	16	16	16	16	16	16	16	16	97	98	97	97	98	98	99	98	99	-	T10	T8	T8	T8
96	AT	75	75	72	76	79	77	86	NO	YES	16	16	16	16	16	16	16	16	16	97	97	97	97	97	97	97	97	97	-	T12	T8	T8	T8
97	D	60	76	83	87	83	85	87	NO	YES	16	16	16	16	16	16	16	16	16	98	99	99	99	99	98	98	98	99	-	T8	T6	T6	T6
98	NN	92	85	86	83	83	87	90	NO	YES	16	16	16	16	16	16	16	16	16	98	98	98	98	99	97	98	98	98	-	T12	T8	T6	T4
99	YM	90	87	90	87	89	99	90	NO	NO	14	16	16	16	16	16	14	14	14	99	99	99	98	98	99	98	98	98	-	T8	T6	T4	T4
100	MS	99	97	81	79	76	84	86	NO	YES	16	16	18	16	16	16	16	16	18	99	98	98	99	98	98	100	100	100	-	T12	T8	T6	T4

Sr. No	INITIALS	SENSORY BLOCK_45	SENSORY BLOCK_60	SENSORY BLOCK_75	SENSORY BLOCK_90	Time of onset of sensory block	Highest level of sensory block	Time to attain highest level of sensory block	Time of 2 segment regression from max block ht	BROMAGE SCORE_0 Mins	BROMAGE SCORE_5	BROMAGE SCORE_10	BROMAGE SCORE_15	BROMAGE SCORE_30	BROMAGE SCORE_45	BROMAGE SCORE_60	BROMAGE SCORE_75	BROMAGE SCORE_90	Time To attain Max. Motor Block	POST HR_0 Mins	POST HR_15 Mins	POST HR_30 Mins	POST HR_45 Mins	POST HR_60 Mins	POST HR_2 Hrs	POST HR_3 Hrs
64	SPK	T8	T8	T8	T10	7	T8	7	83	0	2	2	3	3	3	3	3	3	11	100	102	100	98	100	102	106
65	RS	T6	T8	T9	T9	5	T4	15	40	0	3	3	3	3	3	3	3	3	2	82	80	84	82	84	82	80
66	GS	T8	T8	T10	T10	2	T6	10	43	0	3	3	3	3	3	3	3	3	3	70	72	70	72	74	70	72
67	AKG	T6	T6	T6	T8	15	T6	30	75	0	2	2	3	3	3	3	3	3	13	82	84	86	82	80	78	76
68	SS	T10	T10	T10	T10	3	T8	3	42	0	3	3	3	3	3	3	3	3	2	72	70	74	70	68	64	68
69	JS	T8	T10	T10	T10	5	T8	5	55	0	3	3	3	3	3	3	3	3	4	84	82	80	80	78	82	78
70	BS	T10	T10	T10	T10	5	T8	5	40	0	2	3	3	3	3	3	3	3	6	74	76	74	70	74	78	78
71	VS	T4	T4	T6	T8	6	T4	30	69	0	3	3	3	3	3	3	3	3	2	88	80	82	80	80	78	80
72	JS	T6	T6	T6	T8	15	T6	30	75	0	2	2	3	3	3	3	3	3	12	72	70	74	74	76	74	78
73	SS	T8	T8	T8	T10	25	T8	25	65	0	1	2	2	3	3	3	3	3	20	86	84	82	86	86	82	84
74	MA	T6	T8	T8	T10	10	T6	30	50	0	2	3	3	3	3	3	3	3	8	94	92	94	96	94	92	90
75	RK	T8	T8	T8	T8	3	T6	10	102	0	3	3	3	3	3	3	3	3	3	60	68	70	74	78	80	80
76	SS	T4	T5	T5	T6	6	T4	10	84	0	3	3	3	3	3	3	3	3	5	50	52	60	68	64	60	58
77	BK	T6	T6	T6	T8	4	T6	5	86	0	2	3	3	3	3	3	3	3	6	70	72	70	74	70	68	72
78	AS	T8	T8	T12	-	4	T6	6	41	0	3	3	3	3	3	3	3	2	5	76	70	62	66	68	70	74
79	HS	T6	T8	T10	T12	9	T4	15	36	0	3	3	3	3	3	3	2	1	4	80	84	86	82	80	84	86
80	N	T6	T8	T10	T10	5	T6	10	50	0	3	3	3	3	3	3	3	2	5	90	90	90	90	92	88	90
81	S	T8	T10	T10	T12	2	T6	10	43	0	3	3	3	3	3	2	1	0	2	72	70	68	74	78	80	82
82	GS	T6	T6	T6	T6	7	T6	15	98	0	3	3	3	3	3	3	2	2	5	82	74	74	70	72	74	76
83	AS	T6	T6	T8	T10	10	T6	15	65	0	2	3	3	3	3	3	3	2	10	84	80	82	84	86	88	84
84	JS	T6	T6	T6	T8	5	T6	15	85	0	3	3	3	3	3	3	3	3	4	64	60	64	66	62	64	70
85	A	T10	T10	T12	-	15	T8	15	30	0	2	3	3	3	3	1	0	-	10	88	86	84	88	82	88	88
86	MS	T6	T6	T6	T8	15	T6	30	75	0	1	2	3	3	3	3	3	3	15	84	80	84	84	86	84	84
87	GS	T10	T12	-	-	8	T8	8	37	0	1	2	3	3	3	2	0	-	11	90	90	88	92	94	92	94
88	GS	T8	T8	T8	T8	13	T8	13	122	0	1	3	3	3	3	3	3	3	9	54	52	50	50	56	52	54
89	VK	T10	T10	T10	T10	15	T8	15	30	0	2	3	3	3	3	3	3	3	10	90	88	84	88	90	88	90
90	PS	T6	T6	T6	T8	3	T4	10	42	0	2	3	3	3	3	3	3	3	6	68	58	56	58	56	58	58
91	RPS	T8	T8	T8	T8	4	T6	16	41	0	3	3	3	3	3	3	3	3	4	70	70	74	78	80	82	80
92	VK	T6	T6	T6	T8	6	T6	30	84	0	3	3	3	3	3	3	3	1	5	82	74	80	88	84	86	84
93	B	T4	T6	T6	T8	9	T4	30	51	0	3	3	3	3	3	3	3	3	3	76	74	78	80	78	76	78
94	SS	T8	T8	T8	T10	10	T6	15	35	0	2	3	3	3	3	3	3	3	10	76	74	78	80	82	80	78
95	KS	T8	T8	T8	T10	10	T8	10	80	0	2	3	3	3	3	3	3	3	10	104	98	98	96	96	100	94
96	AT	T8	T8	T8	T8	6	T8	6	99	0	2	3	3	3	3	3	3	3	10	64	64	62	54	58	60	56
97	D	T6	T8	T10	T12	2	T6	10	58	0	3	3	3	3	3	3	2	1	3	70	72	70	68	70	72	74
98	NN	T4	T4	T4	T5	6	T4	30	99	0	3	3	3	3	3	3	3	3	5	86	88	84	80	82	86	80
99	YM	T4	T6	T8	T8	5	T4	15	55	0	2	3	3	3	3	3	3	3	8	78	80	82	84	86	88	84
100	MS	T6	T8	T10	T12	7	T4	30	38	0	2	3	3	3	3	3	3	2	10	64	70	74	72	78	76	74

Sr. No	INITIALS	POST HR_4 Hrs	POST HR_5 Hrs	POST HR_6 Hrs	POSTOPT BRADYCARDIA	POST SBP_0 Mins	POST SBP_15 Mins	POST SBP_30 Mins	POST SBP_45 Mins	POST SBP_60 Mins	POST SBP_2 Hrs	POST SBP_3 Hrs	POST SBP_4 Hrs	POST SBP_5 Hrs	POST SBP_6 Hrs	POST DBP_0 Mins	POST DBP_15 Mins	POST DBP_30 Mins	POST DBP_45 Mins	POST DBP_60 Mins	POST DBP_2 Hrs	POST DBP_3 Hrs	POST DBP_4 Hrs	POST DBP_5 Hrs	POST DBP_6 Hrs	POST MAP_0 Mins	POST MAP_15 Mins	POST MAP_30 Mins	POST MAP_45 Mins	POST MAP_60 Mins	POST MAP_2 Hrs	POST MAP_3 Hrs	POST MAP_4 Hrs	POST MAP_5 Hrs	POST MAP_6 Hrs
64	SPK	100	96	94	NO	126	120	130	128	124	120	122	130	132	136	76	80	70	80	66	70	72	78	72	70	93	93	90	96	85	87	89	95	92	92
65	RS	78	76	76	NO	140	140	130	120	126	120	128	132	140	140	90	80	80	70	70	70	80	70	90	80	107	100	97	87	89	87	96	91	107	100
66	GS	72	74	72	NO	130	130	126	124	126	120	116	114	120	130	70	80	84	74	76	78	70	60	70	80	90	97	98	91	93	92	85	78	87	97
67	AKG	80	78	76	NO	120	126	124	126	130	128	126	124	126	130	80	82	78	80	80	78	70	70	80	80	93	97	93	95	97	95	89	88	95	97
68	SS	70	70	72	NO	126	130	128	126	120	120	116	118	120	130	80	80	78	74	70	80	70	60	70	80	95	97	95	91	87	93	85	79	87	97
69	JS	80	82	84	NO	120	120	130	126	114	112	114	120	130	120	70	80	70	64	70	66	70	70	70	80	87	93	90	85	85	81	85	87	90	93
70	BS	72	70	70	NO	130	120	110	116	120	124	122	120	122	120	80	70	70	74	80	78	70	74	78	70	97	87	83	88	93	93	87	89	93	87
71	VS	84	86	84	NO	130	132	134	136	130	128	126	120	130	136	80	78	78	80	80	74	72	70	78	74	97	96	97	99	97	92	90	87	95	95
72	JS	74	72	70	NO	120	120	122	126	120	120	130	128	126	120	80	78	74	78	70	80	80	74	74	80	93	92	90	94	87	93	97	92	91	93
73	SS	80	84	86	NO	130	120	120	130	130	126	128	126	128	130	80	80	70	70	80	74	78	74	72	80	97	93	87	90	97	91	95	91	91	97
74	MA	90	90	92	NO	130	130	120	126	120	110	116	120	130	124	70	80	80	80	70	70	70	80	80	80	90	97	93	95	87	83	85	93	97	95
75	RK	76	74	78	YES	108	120	126	130	116	122	120	130	130	126	54	70	80	86	80	82	80	80	80	86	72	87	95	101	92	95	93	97	97	99
76	SS	56	58	60	NO	140	138	136	140	140	140	140	140	140	140	86	88	90	90	88	90	88	84	86	90	104	105	105	107	105	107	105	103	104	107
77	BK	74	76	78	NO	126	120	130	116	112	118	112	114	116	120	70	70	70	68	60	70	72	74	78	70	89	87	90	84	77	86	85	87	91	87
78	AS	78	76	78	YES	134	140	136	140	140	138	132	136	130	126	80	70	76	70	80	78	74	78	80	90	98	93	96	93	100	98	93	97	97	102
79	HS	82	84	86	NO	130	130	130	134	136	134	138	132	134	138	80	70	80	84	86	84	80	82	86	84	97	90	97	101	103	101	99	99	102	102
80	N	86	88	84	YES	106	110	110	120	122	130	120	122	124	126	76	78	70	70	74	70	70	74	78	78	86	89	83	87	90	90	87	90	93	94
81	S	78	72	76	NO	118	120	130	120	116	106	120	118	120	120	74	70	80	70	72	68	74	74	70	78	89	87	97	87	87	81	89	89	87	92
82	GS	80	74	78	NO	140	132	134	138	140	130	130	138	136	120	76	84	86	78	80	80	72	74	72	80	97	100	102	98	100	97	91	95	93	93
83	AS	86	84	82	NO	120	120	124	130	126	122	120	128	130	132	72	74	76	70	78	72	72	74	70	72	88	89	92	90	94	89	88	92	90	92
84	JS	74	76	78	NO	140	130	130	140	140	140	140	140	138	136	80	70	80	80	80	90	88	80	84	86	100	90	97	100	100	107	105	100	102	103
85	A	90	82	86	NO	130	120	128	136	138	132	130	130	138	136	70	72	74	78	72	74	78	80	84	78	90	88	92	97	94	93	95	97	102	97
86	MS	86	84	86	NO	110	116	118	120	122	128	130	120	116	120	70	70	72	70	78	74	78	70	68	70	83	85	87	87	93	92	95	87	84	87
87	GS	96	94	92	NO	122	120	118	116	110	110	112	120	128	122	60	60	58	62	68	70	72	68	70	72	81	80	78	80	82	83	85	85	89	89
88	GS	52	50	54	NO	130	138	130	130	136	130	132	130	134	136	70	80	70	74	78	70	74	78	74	76	90	99	90	93	97	90	93	95	94	96
89	VK	92	88	90	YES	130	120	126	128	130	122	120	124	126	130	70	80	82	74	70	74	70	74	78	70	90	93	97	92	90	90	87	91	94	90
90	PS	58	58	56	NO	100	98	100	100	100	100	100	100	100	102	72	68	62	60	62	60	64	60	68	52	81	78	75	73	75	73	76	73	79	69
91	RPS	84	86	80	YES	116	120	122	130	138	140	136	134	130	124	70	70	74	78	76	74	78	76	78	74	85	87	90	95	97	96	97	95	95	91
92	VK	88	82	88	NO	122	126	120	130	128	124	122	128	126	130	86	86	70	84	86	80	78	74	76	80	98	99	87	99	100	95	93	92	93	97
93	B	78	78	80	NO	130	138	136	128	130	120	128	130	128	130	70	74	72	74	70	70	78	70	78	70	90	95	93	92	90	87	95	90	95	90
94	SS	80	82	80	NO	120	120	130	128	122	124	128	126	130	120	70	76	70	78	74	78	74	76	78	70	87	91	90	95	90	93	92	93	95	87
95	KS	92	90	88	NO	136	134	138	132	128	138	130	128	130	134	90	90	86	88	86	90	70	86	80	80	105	105	103	103	100	106	90	100	97	98
96	AT	58	54	58	NO	118	110	112	94	100	116	120	112	120	122	70	70	74	56	60	68	70	72	78	72	86	83	87	69	73	84	87	85	92	89
97	D	76	74	78	NO	118	110	120	110	116	108	120	118	120	116	72	70	70	70	70	60	70	72	78	70	87	83	87	83	85	76	87	87	92	85
98	NN	84	88	86	NO	130	132	134	128	138	134	130	136	130	128	70	74	78	80	82	84	80	86	80	74	90	93	97	96	101	101	97	103	97	92
99	YM	82	84	86	NO	130	134	132	126	120	130	134	136	138	132	70	80	80	72	70	70	80	86	84	80	90	98	97	90	87	90	98	103	102	97
100	MS	72	76	74	NO	126	124	120	120	130	130	136	130	126	120	66	68	70	70	70	80	80	90	80	90	86	87	87	87	90	97	99	103	95	100

Sr. No	INITIALS	POSTOPT HYPOTENSION	POST RR_0 Mins	POST RR_15 Mins	POST RR_30 Mins	POST RR_45 Mins	POST RR_60 Mins	POST RR_2 Hrs	POST RR_3 Hrs	POST RR_4 Hrs	POST RR_5 Hrs	POST RR_6 Hrs	POST SPO2_0 Mins	POST SPO2_15 Mins	POST SPO2_30 Mins	POST SPO2_45 Mins	POST SPO2_60 Mins	POST SPO2_2 Hrs	POST SPO2_3 Hrs	POST SPO2_4 Hrs	POST SPO2_5 Hrs	POST SPO2_6 Hrs	POST VAS_0 Mins	POST VAS_15 Mins	POST VAS_30 Mins	POST VAS_45 Mins	POST VAS_60 Mins	POST VAS_90 Mins	POST VAS_120 Mins	POST VAS_150 Mins	POST VAS_3 Hrs	POST VAS_4 Hrs	POST VAS_5 Hrs	POST VAS_6 Hrs	Time of 1st analgesia postoperati vely
64	SPK	NO	18	16	16	14	14	14	12	12	14	12	96	97	96	97	98	97	97	96	97	98	0	0	0	0	0	0	0	0	1	1	1	2	480
65	RS	NO	18	18	16	16	14	14	12	12	14	12	98	97	96	97	98	97	96	97	96	97	0	0	0	0	0	0	1	2	3	4	-	-	240
66	GS	NO	14	14	14	12	12	14	16	12	12	14	98	97	97	98	99	98	97	98	97	98	0	0	0	0	0	1	1	2	2	3	3	4	360
67	AKG	NO	14	14	16	14	14	16	14	14	16	14	96	97	97	98	98	99	100	98	96	98	0	0	0	0	0	0	1	1	2	2	3	3	420
68	SS	NO	14	14	14	16	14	14	14	14	14	14	98	98	96	97	98	99	98	97	98	98	0	0	0	0	0	0	0	0	1	2	2	3	420
69	JS	NO	14	14	16	16	14	12	12	12	12	14	98	97	97	98	97	98	100	98	99	98	0	0	0	0	1	2	3	3	4	-	-	-	180
70	BS	NO	14	14	14	16	16	14	16	18	14	12	98	98	98	99	100	98	96	94	98	99	0	0	0	0	0	0	0	1	1	2	2	3	420
71	VS	NO	16	16	14	14	14	14	12	12	12	12	100	100	98	98	98	98	98	97	97	97	0	0	0	0	1	2	2	3	4	-	-	-	180
72	JS	NO	14	14	16	14	14	14	16	16	14	12	98	98	99	98	99	97	96	97	98	99	0	0	0	0	0	0	0	1	1	2	2	3	420
73	SS	NO	14	14	14	16	14	12	14	12	12	12	99	98	97	96	97	98	97	98	97	97	0	0	0	1	2	3	4	-	-	-	-	-	120
74	MA	NO	14	14	16	14	14	14	14	14	16	14	98	98	98	97	96	97	98	97	98	97	0	0	0	0	1	1	2	2	2	3	3	3	420
75	RK	NO	18	16	18	14	14	14	14	14	14	14	99	98	99	98	98	98	98	98	98	98	0	0	0	0	0	1	2	3	3	4	-	-	240
76	SS	NO	12	14	18	20	22	20	18	16	16	16	98	98	98	99	97	98	99	98	99	98	0	0	0	0	0	0	0	0	1	1	2	4	360
77	BK	NO	16	16	16	14	14	14	14	12	12	12	98	99	98	98	97	98	98	99	98	99	0	0	0	0	0	0	0	1	1	2	4	-	300
78	AS	NO	16	16	16	14	14	14	14	14	14	14	100	100	100	98	98	98	98	99	99	99	0	0	0	0	0	0	0	0	1	3	4	-	300
79	HS	NO	16	16	16	16	16	16	16	16	16	16	99	98	99	98	99	98	99	99	99	98	0	0	0	0	0	0	0	0	1	2	4	-	300
80	N	NO	16	16	16	16	16	16	16	16	16	16	98	99	99	98	98	99	98	99	98	98	0	0	0	0	0	0	0	0	1	3	3	4	360
81	S	NO	14	14	14	14	12	12	12	12	14	14	98	99	98	98	98	99	98	99	98	99	0	0	0	0	0	0	0	0	1	1	2	3	420
82	GS	NO	16	16	18	18	16	16	16	14	14	14	98	98	99	99	98	98	99	98	99	98	0	0	0	0	0	0	0	1	2	4	-	-	240
83	AS	NO	14	14	14	14	14	12	12	12	12	12	98	99	98	98	98	99	99	98	98	99	0	0	0	0	0	0	0	1	1	3	4	-	300
84	JS	NO	16	16	14	16	16	16	14	14	14	14	97	97	96	96	96	95	96	96	96	95	0	0	0	0	0	1	3	3	4	-	-	-	240
85	A	NO	14	16	14	14	16	16	16	14	14	14	98	99	98	98	99	99	98	97	96	99	0	0	0	0	0	0	0	0	4	-	-	-	180
86	MS	NO	16	14	16	16	14	14	14	14	14	14	96	97	96	97	96	97	97	97	97	96	0	0	0	0	0	0	1	1	2	2	3	3	4	360
87	GS	NO	16	16	16	14	14	14	14	14	14	14	99	98	98	97	98	98	98	97	98	98	0	0	0	0	0	0	1	1	2	2	3	4	360
88	GS	NO	16	16	16	16	16	16	14	14	14	14	98	99	98	98	98	98	99	98	99	98	0	0	0	0	0	0	0	1	3	4	-	-	240
89	VK	NO	16	16	16	16	16	16	16	16	16	16	99	99	98	98	99	98	99	98	99	98	0	0	0	0	0	0	0	0	1	3	4	-	300
90	PS	NO	16	16	18	16	16	18	16	16	16	18	99	98	97	99	98	98	98	99	98	99	0	0	0	0	0	0	1	1	2	2	4	-	300
91	RPS	NO	16	16	16	16	4	14	14	14	14	14	96	97	97	97	97	98	98	97	98	98	0	0	0	0	0	0	0	2	3	4	-	-	240
92	VK	NO	16	16	16	16	16	16	16	14	14	14	100	100	98	99	98	98	98	97	98	99	0	0	0	0	0	0	0	0	1	2	3	4	360
93	B	NO	16	16	16	16	16	14	14	14	14	14	98	98	98	99	98	98	98	99	98	98	0	0	0	0	0	0	0	0	0	1	2	3	420
94	SS	NO	16	16	16	14	14	14	14	14	14	14	98	98	98	98	99	98	99	98	99	98	0	0	0	0	0	1	2	3	3	4	-	-	240
95	KS	NO	16	16	12	14	14	16	16	14	12	12	99	96	95	98	98	98	98	98	98	98	0	0	0	0	0	0	1	2	3	4	-	-	240
96	AT	NO	16	16	16	16	14	14	14	14	14	14	97	99	99	100	98	98	98	98	99	99	0	0	0	0	0	1	2	3	4	-	-	-	180
97	D	NO	16	16	16	16	16	16	16	16	16	16	99	98	99	98	99	99	99	98	98	98	0	0	0	0	0	0	0	0	0	1	2	4	360
98	NN	NO	16	16	16	16	16	16	14	14	14	14	98	98	98	98	99	98	97	98	97	98	0	0	0	0	0	1	2	3	4	-	-	-	180
99	YM	NO	14	14	16	14	14	16	16	16	14	14	98	99	98	99	98	99	98	99	99	98	0	0	0	0	0	0	0	0	1	3	4	-	300
100	MS	NO	18	18	16	16	16	16	14	14	14	14	100	99	99	98	99	99	98	99	98	99	0	0	0	0	0	0	0	0	1	2	3	4	360

Sr. No	INITIALS	POST SENSORY BLOCK_0 Mins	POST SENSORY BLOCK_15 Mins	POST SENSORY BLOCK_30 Mins	POST SENSORY BLOCK_45 Mins	POST SENSORY BLOCK_60 Mins	POST SENSORY BLOCK_90 Mins	POST SENSORY BLOCK_120 Mins	POST SENSORY BLOCK_150 Mins	POST SENSORY BLOCK_3 Hrs	POST SENSORY BLOCK_4 Hrs	POST SENSORY BLOCK_5 Hrs	POST SENSORY BLOCK_6 Hrs	Time of regression to segment T12	POST MOTOR BLOCK_0 Mins	POST MOTOR BLOCK_15 Mins	POST MOTOR BLOCK_30 Mins	POST MOTOR BLOCK_45 Mins	POST MOTOR BLOCK_60 Mins	POST MOTOR BLOCK_90 Mins	POST MOTOR BLOCK_120 Mins	POST MOTOR BLOCK_150 Mins	POST MOTOR BLOCK_3 Hrs	POST MOTOR BLOCK_4 Hrs	POST MOTOR BLOCK_5 Hrs	POST MOTOR BLOCK_6 Hrs	Time Unitill Full Recovery Of Motor Function (Mins)
64	SPK	T10	T10	T10	T12	-	-	-	-	-	-	-	-	128	3	3	3	3	3	2	1	0	-	-	-	-	229
65	RS	T9	T10	T12	-	-	-	-	-	-	-	-	-	115	3	3	3	2	1	0	-	-	-	-	-	-	178
66	GS	T10	T10	T10	T12	-	-	-	-	-	-	-	-	133	3	3	3	2	2	2	1	0	-	-	-	-	237
67	AKG	T8	T10	T10	T12	-	-	-	-	-	-	-	-	135	3	3	3	3	3	2	1	0	-	-	-	-	227
68	SS	T10	T10	T10	T12	-	-	-	-	-	-	-	-	132	3	3	3	3	2	1	0	-	-	-	-	-	208
69	JS	T10	T12	-	-	-	-	-	-	-	-	-	-	100	3	2	2	1	0	-	-	-	-	-	-	-	146
70	BS	T10	T10	T12	-	-	-	-	-	-	-	-	-	115	3	3	2	1	0	-	-	-	-	-	-	-	144
71	VS	T8	T12	-	-	-	-	-	-	-	-	-	-	99	3	2	1	0	-	-	-	-	-	-	-	-	133
72	JS	T8	T8	T10	T10	T12	-	-	-	-	-	-	-	135	3	3	3	3	2	1	0	-	-	-	-	-	198
73	SS	T10	T12	-	-	-	-	-	-	-	-	-	-	80	3	2	1	0	-	-	-	-	-	-	-	-	115
74	MA	T10	T10	T12	-	-	-	-	-	-	-	-	-	110	3	3	2	1	0	-	-	-	-	-	-	-	142
75	RK	T8	T10	T12	-	-	-	-	-	-	-	-	-	117	3	3	3	3	1	0	-	-	-	-	-	-	177
76	SS	T6	T8	T10	T12	-	-	-	-	-	-	-	-	129	3	2	0	-	-	-	-	-	-	-	-	-	115
77	BK	T8	T10	T12	-	-	-	-	-	-	-	-	-	116	3	2	1	0	-	-	-	-	-	-	-	-	129
78	AS	T12	-	-	-	-	-	-	-	-	-	-	-	71	2	1	0	-	-	-	-	-	-	-	-	-	115
79	HS	T12	-	-	-	-	-	-	-	-	-	-	-	81	1	0	-	-	-	-	-	-	-	-	-	-	101
80	N	T10	T10	T12	-	-	-	-	-	-	-	-	-	115	2	1	0	-	-	-	-	-	-	-	-	-	115
81	S	T12	-	-	-	-	-	-	-	-	-	-	-	88	0	-	-	-	-	-	-	-	-	-	-	-	88
82	GS	T6	T8	T8	T8	T10	T12	-	-	-	-	-	-	173	2	2	2	0	-	-	-	-	-	-	-	-	130
83	AS	T10	T12	-	-	-	-	-	-	-	-	-	-	95	2	1	0	-	-	-	-	-	-	-	-	-	110
84	JS	T8	T12	-	-	-	-	-	-	-	-	-	-	100	3	3	3	3	3	2	1	0	-	-	-	-	236
85	A	T12	-	-	-	-	-	-	-	-	-	-	-	60	0	-	-	-	-	-	-	-	-	-	-	-	65
86	MS	T8	T10	T12	-	-	-	-	-	-	-	-	-	105	3	2	1	0	-	-	-	-	-	-	-	-	120
87	GS	-	-	-	-	-	-	-	-	-	-	-	-	52	-	-	-	-	-	-	-	-	-	-	-	-	64
88	GS	T8	T8	T8	T10	T12	-	-	-	-	-	-	-	137	3	3	3	2	1	0	-	-	-	-	-	-	171
89	VK	T10	T12	-	-	-	-	-	-	-	-	-	-	90	3	2	0	-	-	-	-	-	-	-	-	-	110
90	PS	T8	T10	T12	-	-	-	-	-	-	-	-	-	117	3	2	1	0	-	-	-	-	-	-	-	-	129
91	RPS	T8	T8	T8	T8	T8	T10	T12	-	-	-	-	-	206	3	3	3	2	2	1	0	-	-	-	-	-	206
92	VK	T8	T12	-	-	-	-	-	-	-	-	-	-	99	1	0	-	-	-	-	-	-	-	-	-	-	100
93	B	T8	T10	T12	-	-	-	-	-	-	-	-	-	111	3	3	2	1	0	-	-	-	-	-	-	-	147
94	SS	T10	T10	T10	T10	T10	T12	-	-	-	-	-	-	170	3	3	3	3	2	1	0	-	-	-	-	-	200
95	KS	T10	T12	-	-	-	-	-	-	-	-	-	-	95	3	2	1	1	0	-	-	-	-	-	-	-	140
96	AT	T8	T10	T12	-	-	-	-	-	-	-	-	-	114	3	3	2	1	0	-	-	-	-	-	-	-	140
97	D	T12	-	-	-	-	-	-	-	-	-	-	-	88	1	0	-	-	-	-	-	-	-	-	-	-	102
98	NN	T5	T6	T6	T8	T10	T12	-	-	-	-	-	-	174	3	3	3	3	3	2	1	0	-	-	-	-	235
99	YM	T8	T10	T12	-	-	-	-	-	-	-	-	-	115	3	2	1	0	-	-	-	-	-	-	-	-	127
100	MS	T12	-	-	-	-	-	-	-	-	-	-	-	83	2	1	0	-	-	-	-	-	-	-	-	-	110

6829
29/08/2020

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No.08 BFUHS/ 6888 Date 20/8/2020

The Principal
Dayanand Medical College,
Ludhiana

Subject: **Change and Delete of Co-Supervisor**

This is in reference to your office on the above mentioned subject. In this connection, you are informed that the Worthy Vice Chancellor has very kindly accepted your recommendations and appointed new Supervisor & Co-supervisor as mentioned below.

Name of Student/	Specialty	Existing Guides	Proposed Guides
Dr. Arshnoor Kaur	General Surgery	**Supervisor:** Dr. Sanjeev K. Singla Prof., Dept. of Surgery, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Jaspal Singh Prof. & Head, Dept. of Surgery, DMCH, Ludhiana.	**Supervisor:** Dr. Sanjeev K. Singla Prof., Dept. of Surgery, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Jaspal Singh Prof. & Head, Dept. of Surgery, DMCH, Ludhiana. Dr. Munish Trehan Assoc. Prof., Dept. of Surgery, DMCH, Ludhiana.
Dr. Nitika Singla /	Anaesthesiology	**Supervisor:** Dr. Sunil Katyal Prof. & Head, Dept. of Anaesthesiology, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Kamakshi Garg Assoc. Prof., Dept. of Anaesthesiology, DMCH, Ludhiana. Dr. Ashima Taneja Prof. & Head, Dept. of Obst. & Gynae., DMCH, Ludhiana.	**Supervisor:** Dr. Kamakshi Garg Assoc. Prof., Dept. of Anaesthesiology, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Anju Grewal Prof., Dept. of Anaesthesiology, DMCH, Ludhiana. Dr. Ashima Taneja Prof. & Head, Dept. of Obst. & Gynae., DMCH, Ludhiana.

All conc
DMV 24/8/20

Dr. Richa /	Anaesthesiology	**Supervisor:** Dr. Sunil Katyal Prof. & Head, Dept. of Anaesthesiology, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Mirley Rupinder Singh Prof., Dept. of Anaesthesiology, DMCH, Ludhiana. Dr. Namrata Assoc. Prof., Dept. of Anaesthesiology, DMCH, Ludhiana.	**Supervisor:** Dr. Dinesh Sood Prof. & Head, Dept. of Anaesthesiology, DMCH, Ludhiana. **Co-supervisor(s):** Dr. Mirley Rupinder Singh Prof., Dept. of Anaesthesiology, DMCH, Ludhiana. Dr. Namrata Assoc. Prof., Dept. of Anaesthesiology, DMCH, Ludhiana.

The student may be requested to attach photocopy of this letter along with plan approval letter while submitting thesis in the university. All concerned may also be informed accordingly.

Dr. S P Singh, MS (Oph)

Controler of Examinations

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No. BFUHS/2K19p-TH/ 10386

Date 9/9/19

The Principal,
DMC, Ludhiana.

Subject: Approval of Plan of Thesis.

This is to inform you that the Faculty of Medical Sciences in its meeting held on 29.05.2019 has approved the plan of thesis of **Richa**, a student of your college for **MD Anaesthesiology** along with the names of Supervisor/Co-Supervisor as under:-

Topic Plan of Thesis

A comparative study of intrathecal magnesium sulphate versus fentanyl as an adjuvant to bupivacaine

Supervisor
Dr. Sunil Katyal
Prof. & Head,
Dept. of
Anaesthesiology,
DMCH, Ludhiana.

Co-Supervisor
Dr. Mirley Rupinder Singh
Prof.,
Dept. of Anaesthesiology,
DMCH, Ludhiana.

Dr. Namrata
Assoc. Prof.,
Dept. of Anaesthesiology,
DMCH, Ludhiana.

The student has to submit the four copies of thesis (along with PDF format) , to the Controller of Examinations, BFUHS, Faridkot, at least six months before the commencement of theory examination, if he/she is otherwise eligible to take the examination. He /She must directed to attach a photocopy of this letter with the forwarding letter while submitting thesis to the University along with the letter of approval of University for change of supervisor/Co-Supervisor, change of topic,(if any).

S P Singh

Dr. S P Singh MS(Oph)
Controller of Examinations

Note :

1. *If any discrepancy found regarding topic of thesis or Supervisor/Co-Supervisor, inform undersigned within one month after issue of this letter.*
2. *The student may submit the thesis as per the schedule already conveyed i.e for May/June examination 30th Nov of the preceding the year of examination and for Nov/Dec examinations 31st May of the year of examination.*

A COMPARATIVE STUDY OF INTRATHECAL MAGNESIUM SULPHATE VERSUS INTRATHECAL FENTANYL AS AN ADJUVANT TO BUPIVACAINE

THESIS PROPOSAL

FOR APPROVAL OF SUBJECT OF THESIS TO BE SUBMITTED

IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

Doctor of Medicine

In

ANAESTHESIOLOGY

OF THE

BABA FARID UNIVERSITY OF HEALTH SCIENCES

FARIDKOT

December, 2018

Dr. Richa

DEPARTMENT OF ANAESTHESIOLOGY
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA
LUDHIANA, PUNJAB-141001

ABSTRACT OF PLAN OF THESIS

Title	A COMPARATIVE STUDY OF INTRATHECAL MAGNESIUM SULPHATE VERSUS FENTANYL AS AN ADJUVANT TO BUPIVACAINE
For the degree of	M.D. Anaesthesiology
Name of the candidate	Dr. Richa
Supervisor	Dr. Sunil Katyal, Professor & Head, Department of Anaesthesia, DMCH, Ludhiana
Co-supervisor	Dr. Mirley Rupinder Singh, Professor, Department of Anaesthesia, DMCH, Ludhiana Dr. Namrata, Associate Professor, Department of Anaesthesia, DMCH, Ludhiana
Institution	Dayanand Medical College and Hospital, Ludhiana
University	Baba Farid University of Health Sciences, Faridkot

Introduction: Local anaesthetics like bupivacaine are used for spinal anaesthesia. Opioids and non opioids have been used as adjuvants to enhance the efficacy and duration of action of local anaesthetics and decrease their dosage and provide haemodynamic stability.

Aim of study: To compare intrathecal magnesium sulphate and fentanyl as adjuvants to 0.5% hyperbaric bupivacaine in terms of onset and duration of sensory and motor block and haemodynamic parameters.

Material and Methods: A total of 100 patients of ASA grade I and II of age groups 18 to 70 years of each sex will be selected and will be divided into 2 groups of 50 each. The study will be a randomised controlled, double blind study and allocation of patients to each group will be random. Group 1 will receive 2.5 mL of 0.5% bupivacaine + 0.5 mL of fentanyl (25mcg) and group 2 will receive 2.5 mL of 0.5% bupivacaine + 0.2 mL of magnesium sulphate (100 mg) +0.3 mL of distilled water.

Clinical significance: Significance of this study is to compare the efficacy of fentanyl and magnesium sulphate in terms of duration of sensory and motor block and the quality of post operative analgesia. In addition, time for first rescue analgesic in both the groups will be noted.

Keywords: Subarachnoid block, hyperbaric bupivacaine, fentanyl, magnesium sulphate, postoperative analgesia

(Signature)	(Signature)	(Signature)	(Signature)	(Signature)
Candidate	Co-supervisor	Co-supervisor	Supervisor	Principal

CERTIFICATE OF FACILITIES AVAILABLE

This is to certify that the facilities for work on the subject of thesis titled "**A COMPARATIVE STUDY OF INTRATHECAL MAGNESIUM SULPHATE VERSUS FENTANYL AS AN ADJUVANT TO BUPIVACAINE**" exist in the Department of Anaesthesiology at Dayanand Medical College and Hospital, Ludhiana and will be provided to the candidate. We will see that the data being included in the thesis are genuine and is collected by the candidate herself under our supervision and guidance.

Supervisor

Dr. Sunil Katyal
Professor & Head
Department of Anaesthesia
DMCH, Ludhiana

Co-Supervisor

Dr. Mirley Rupinder Singh
Professor
Department. of Anaesthesia
DMCH, Ludhiana

Dr. Namrata
Associate Professor
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Dr. Sunil Katyal
Professor & Head
Department of Anaesthesia
DMCH, Ludhiana

Place : Ludhiana

Date : 15/12/2018

APPROVAL PROFORMA
BY
RESEARCH & ETHICAL COMMITTEE
DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA

Name of candidate	Dr. Richa
Department	Anaesthesiology
Topic of Thesis	A COMPARATIVE STUDY OF INTRATHECAL MAGNESIUM SULPHATE VERSUS FENTANYL AS AN ADJUVANT TO BUPIVACAINE
Likely date of appearing in PG examination	May, 2021
Date of enrollment	10th May,2018
Name of Head of Department	Dr. Sunil Katyal
1) Supervisor **2) Co-Supervisor**	Dr. Sunil Katyal Dr. Mirley Rupinder Singh Dr. Namrata
Signature of Members of Research Committee with Stamp	**Signature of Members of Ethics Committee with Stamp**
1. HOD Pharmacology	1. HOD Physiology
2. HOD Surgery	2. HOD Pathology
3. HOD Pathology	3. HOD Pharmacology
4. HOD Medicine	4. HOD SPM
5. Dean Academics	5. HOD Medicine
6. Vice Principal	6. HOD Surgery
	7. HOD Obst. & Gynae
	8. Legal Expert
	9. Secretary, IEC
	10. Dean Academics
	11. Vice Principal
	12. Principal

Approved: Yes / No

Chairperson
Research Committee

Chairperson
Research Committee

Approved: Yes / No

Chairperson
Ethics Committee

Chairperson
Ethics Committee

BABA FARID UNIVERSITY OF HEALTH SCIENCES, FARIDKOT

PROFORMA FOR REGISTRATION OF SUBJECT FOR DISSERTATION

1	NAME OF THE CANDIDATE AND ADDRESS	DR. RICHA 33-A,DASHMESH COLONY, RAJPURA, DISTT. PATIALA, PUNJAB.
2	NAME OF THE INSTITUTE	DAYANAND MEDICAL COLLEGE & HOSPITAL, LUDHIANA
3	COURSE OF STUDY AND SUBJECT	MD ANAESTHESIOLOGY
4	DATE OF ADMISSION OF COURSE	MAY 10,2018
5	TITLE OF THE TOPIC	A COMPARITIVE STUDY OF INTRATHECAL MAGNESIUM SULPHATE VERSUS FENTANYL AS AN ADJUVANT TO BUPIVACAINE

6. BRIEF RESUME OF THE INTENDED WORK

6.1 NEED FOR THE STUDY

Bupivacaine, amide in nature, is the most commonly used local anaesthetic in subarachnoid blocks. Higher doses of bupivacaine can lead to hemodynamic alterations causing hypotension and bradycardia.[1,2] Hence, the dose of bupivacaine should be tailored so as to avoid detrimental consequences to the patients.

Both opioid and non opioids have been studied to be used as adjuvants to reduce the dose of bupivacaine and thereby reducing its side effects and providing better haemodynamic stability. Fentanyl, an opioid, is a mu receptor agonist. It prolongs analgesia and reduces the dose of bupivacaine required for adequate anaesthesia. It is effective in intensifying the sensory block without increasing the sympathetic block but it too is associated with side effects like respiratory depression, pruritis, nausea, vomiting and urinary retention.[3]

This study is to find out the efficacy of non-opioids as adjuvants so that the quality of anaesthesia is improved without the side effects associated with mu receptor agonism. One of the centrally acting non-opioid analgesic is Magnesium sulphate which antagonises the NMDA receptors in the CNS. Painful stimuli lead to release of aspartate and glutamate which cause voltage mediated calcium influx into the cells. Calcium entry leads to central sensitization and long term potentiation of spinal cord. By antagonizing NMDA receptors magnesium blocks this signaling thus preventing central sensitization from peripheral nociceptive stimuli. Moreover, magnesium is also a physiological antagonist of calcium.[4-6] Thus, by this action in the CNS it

acts as an antinociceptive.[7,8] Magnesium also has neuroprotective effect on cerebellar neurons against glutamate toxicity.[9]

Through this study we tend to compare fentanyl and magnesium sulphate and look for a better adjuvant which prolongs the duration of sensory block, reduces postoperative analgesic requirement and provides better hemodynamic stability without the side effects associated with opioid analgesics.

Various studies have been done on fentanyl[10] and magnesium[11] to provide evidence for their effectiveness in subarachnoid block for infra-umbilical surgeries like laproscopic gynaecological surgeries, caesarean sections, lower limb surgeries etc. In this study, we propose to choose lower limb orthopaedic surgeries to compare fentanyl and magnesium sulphate to find out the better analgesic in terms of onset and duration of sensory and motor block, effects on haemodynamics and their side effect profile in the intraoperative and post operative period. We also propose this study to find out that which adjuvant will provide better post operative analgesia and thus requiring lesser dose of rescue analgesics..[12-14]

6.2 REVIEW OF LITERATURE

Spinal anaesthesia was administered for the 1st time by James Corning, a neurologist in 1885 which was an accidental dural puncture while using cocaine on spinal nerves of dogs.[15] He reported anaesthesia in hind limb of dogs. 1st planned spinal anaesthesia for surgery in man was administered by Karl August Bier in 1898.

Telivuo in 1963 introduced bupivacaine. It is a long acting amide local anaesthetic with a rapid onset and long duration of action.

Various studies have shown side effects of bupivacaine like dysrythmias, haeomodynamic instability, heart blocks, ventricular tachycardia, circumoral numbness, vertigo, tinnitus, slurred speech, drowsiness and seizures. This can be prevented by using adjuvants so as to reduce the dose of local anaesthetic required to attain a desired level of anaesthesia.[1]

Studies have been done using adjuvants with bupivacaine in the past and have found evidence in favour of use of opioids and non opioids.

Intrathecal opioids have potent synergistic analgesic effect so if used as adjuvants, they allow reduction in the dose of local anaesthetics. They act on mu receptors in substantia gelatinosa of the dorsal horn and suppress excitatory neuropeptide release from C fibres thus providing analgesia.

Fentanyl is a lipophilic opioid which produces better quality of analgesia if used with local anaesthetics but it is also associated with certain side effects. Various studies have shown intrathecal fentanyl to cause side effects like nausea, vomiting, pruritus, urinary retention and respiratory depression. Wong CA et al carried out a double blind and randomized controlled study to find out optimal dose of intrathecal fentanyl with 2.5 mg bupivacaine for initiation of

labour analgesia. 6 groups received doses of 0, 5, 10, 15, 20 and 25 mcg of fentanyl. The authors concluded that the duration of analgesia was shorter for 0, 5 and 10 mcg group as compared to 15, 20 and 25 mcg group. There was difference in the incidence of nausea and vomiting and the incidence of pruritus was greater in all the groups receiving fentanyl.[15]

Magnesium sulphate, a non – opioid, is also used intrathecally as an additive to bupivacaine. It acts as an anti-nociceptive by antagonizing NMDA receptors in the CNS. It does not produce side effects like urinary retention, respiratory depression, pruritis etc as seen with opioids such as fentanyl.

Khadke SJ et al carried a randomized and double blind study to investigate the effect of adding neostigmine and magnesium sulphate to 0.5% hyperbaric bupivacaine.[9] They concluded that neostigmine and magnesium does not affect characteristics of spinal anaesthesia but the incidence of bradycardia and atropine requirement was lowest in patients receiving magnesium as an adjuvant.

Mohamed KS et al did a study to find the effectiveness of intrathecal magnesium sulphate as an adjuvant to bupivacaine on surgeon satisfaction and postoperative analgesia in laproscopic gynaecological surgeries. They studied 60 patients. 30 of them received only bupivacaine and the rest 30 received 50 mg magnesium sulphate in addition to bupivacaine for laproscopic gynaecological surgeries. They concluded that addition of 50 mg of magnesium sulphate to bupivacaine led to decreased analgesic requirement in the post operative period. Also, period of post operative pain relief was longer in the group receiving magnesium sulphate with bupivacaine.[16]

Katiyar S et al did a study to compare magnesium sulphate and fentanyl as adjuvants to bupivacaine in spinal anaesthesia for infraumbilical surgeries. They concluded that addition of 100 mg of magnesium sulphate or 25 mcg of fentanyl to intrathecal bupivacaine significantly prolongs the duration of analgesia. At these doses, the incidence of hypotension and bradycardia was more in fentanyl group as compared to magnesium group. Moreover, the fentanyl group showed side effects like sedation, pruritis and respiratory depression which were absent in the magnesium group.[17]

Yadav M et al carried out a study in which they compared 4 groups for infraumbilical surgeries which received 0.5% bupivacaine, 0.5% bupivacaine + 25 mcg fentanyl, 0.5% bupivacaine + 50 mg magnesium and 0.5% bupivacaine + 100 mg magnesium sulphate respectively. All 4 groups received equal volumes of intrathecal drugs. The mean duration of analgesia in the 4 groups was 272, 360, 252 and 276 min respectively. So they concluded that addition of 100 mg magnesium sulphate is as effective as fentanyl in terms of duration of analgesia.[18]

Khalili G et al performed a double blind randomized controlled trial undergoing lower limb orthopaedic surgeries. The patients were randomly allocated to receive 100 mg of 5% magnesium sulphate (0.2 mL) with 15 mg of 0.5% bupivacaine or 0.2 mL of saline combined with 15 mg of 0.5% bupivacaine intrathecally. They concluded that addition of 100 mg of magnesium sulphate intrathecally to 15 mg of bupivacaine without opioid supplementation, prolonged the duration of sensory block, decreased postoperative analgesic consumption and significantly prolonged the onset of spinal anaesthesia.[12]

Unlugenc H et al performed a prospective, randomized, double blind study to investigate the sensory, motor and analgesic block characteristics of intrathecal magnesium 50 mg compared with fentanyl 25 mcg and saline when added to 0.5% bupivacaine (10 mg). In their study they concluded that addition of 50 mg magnesium sulphate did not shorten the onset time of sensory and motor blockade or prolong the duration of spinal anaesthesia as seen with fentanyl. Pruritis, as a side effect was significantly higher in the fentanyl group.[19]

In our study, we will compare 100 mg magnesium sulphate with 25 mcg of fentanyl as adjuvants to bupivacaine intrathecally.

6.3 AIMS AND OBJECTIVES OF THE STUDY

To compare intrathecal fentanyl and magnesium sulphate as adjuvants to bupivacaine in subarachnoid block in terms of

- Onset and duration of sensory and motor block.
- Intraoperative and postoperative haemodynamic profile.

7. MATERIALS AND METHODS

7.1 SOURCE OF DATA

After acceptance by the ethical committee, this study will be conducted in the Department of Anaesthesiology DMCH, Ludhiana. Patients of ASA grade I and II, aged 18-70 years of either sex posted for elective lower limb surgeries will be considered for the study.

7.2 METHOD OF COLLECTION OF DATA

Total of 100 patients will be randomly allocated into either of two study groups of 50 patients each by computer generated randomization codes contained in sealed, sequentially numbered envelopes. A written informed consent will be obtained from each patient prior to the procedure.

INCLUSION CRITERIA-

- ASA I and II
- Age 18-70 years

EXCLUSION CRITERIA-

- Patients not giving consent for subarachnoid block.
- Patients with deformities of spine i.e. scoliosis and kyphoscoliosis.
- Patients with deranged coagulation profile or pre existing bleeding disorders.
- Infection at the site of block.
- Patients who are allergic to the drugs being used.
- Patients with pre existing severe cardiovascular diseases (like ischemic heart disease, heart failure, ventricular hypertrophy, coronary artery disease etc.), neurological or hepatorenal diseases.

- Patients in whom mode of anaesthesia will have to be converted to general anaesthesia due to inadequate block.

GROUP ALLOCATION: The selected patients will be divided into 2 groups based on table of random numbers.

Group I - Patients in this group will receive 2.5 mL of 0.5% heavy bupivacaine (12.5 mg) + 0.5 ml of fentanyl (25 mcg) to make a total volume of 3 mL.

Group II- Patients in this group will receive 2.5 mL of 0.5% heavy bupivacaine (12.5mg) + 0.2 mL of magnesium sulphate (100 mg) with 0.3 mL of distilled water to make total volume of 3 mL.

PREANAESTHETIC CHECK UP

All the patients will undergo a preanaesthetic checkup which will include a detailed history, general physical examination, systemic examination and routine investigations (complete haemogram, PT-INR, renal function test, serum electrolytes, chest x-ray and electrocardiogram).

The patients will be kept nil per oral for atleast 8 hours before surgery.

PRE MEDICATION

1. Tablet Ranitidine 150 mg will be given at night and at 6 am in the morning of surgery.

2. Tablet Alprazolam 0.25 mg will be given at night and at 6 am in the morning of surgery.

On the day of surgery, after a pre operative evaluation and measurement of vitals i.e. heart rate (HR), blood pressure (BP), oxygen saturation (SpO_2), patients will be shifted to the operation theatre.

ANAESTHESIA TECHNIQUE

Monitors will be attached to the patient to monitor HR, BP and SpO_2. ECG will also be applied to the patient. Under all aseptic conditions, L3-L4 or L4-L5 vertebral interspace will be palpated with patient in sitting position. 2mL of 2% lignocaine will be locally infilterated in the area of palpated space. 26 guage Quincke's needle will then be inserted in the space .After confirmation of free flow of CSF, the drug mixture will be given in the space.

The drug mixture to be given will be decided by coded envelopes made by a person not involved in the study. The envelope will be opened by the consultant (anaesthesiologist) of the operation theatre who will prepare the drug mixture. After administration of the drug in the subarachnoid space, patient will be made to lie in supine position. No additional analgesic will be given unless on request by the patient. Onset and duration of sensory and motor block and the intraoperative haemodynamic profile will be monitored by the attending anaesthesiologist during the surgery who will be blinded to the drug mixture delivered. After the surgery patient will be shifted to the recovery room. The drug mixture given will be decoded after the study.

OBSERVATION

Onset of sensory block will be assessed by pinprick and will be taken as the point of time at which patient will be unable to feel the pinprick at the level of T8. Duration of sensory block will be taken as time of regression of two segments in maximum block height. Onset of motor block will be taken as time to attain modified bromage score of 3 after the injection of drug mixture.

MODIFIED BROMAGE SCORE

0- free movement of legs and feet

1- Unable to raise extended legs but able to flex knees with free movement of feet.

2- Unable to flex knees but with free movement of feet.

3- Unable to move legs and feet

Duration of motor block will be taken as the time from onset of motor block till the attainment of modified bromage score of 0.

INTRAOPERATIVE ASSESSMENT

The sensory block will be recorded at 0, 5, 10 and 15 mins after intrathecal injection and subsequently every 15 mins. The highest level of sensory block will be recorded by pinprick at mid clavicular line anteriorly every 5 minutes for the first 15 minutes and then every 15 minutes till 90 mins.

Motor block will also be recorded at 0, 5, 10 and 15 mins and then every 15 minutes till 90 mins.

Haemodynamic parameters i.e.HR, BP and SpO_2 of the patient will be recorded at 0, 5, 10, 15 mins in the intraoperative period after intrathecal injection and then every 15 mins till 90 mins. Fall in SBP by more than 20% below the pre-anaesthetic levels will be treated with intermittent doses of i.v. ephedrine 3mg. Fall in HR below 20% of baseline will be treated with 0.6mg of i.v. atropine.

POSTOPERATIVE ASSESSMENT

Immediately after shifting the patient to recovery room, HR, SBP, DBP, MAP, respiratory rate (RR) and SpO_2 will be recorded every 15 mins for the first 60 mins and then hourly till 6 hours.

Quality of post operative analgesia will be assessed using Visual analogue scale (VAS) (which ranges from 0 indicating no pain till 10 indicating severe

intolerable pain) which will be explained preoperatively to the patient.VAS score will be recorded at 0, 2, 4 and 6 hours postoperatively. Patient with VAS score of 4 or more will be given injection Tramadol intravenously slowly. Total supplemental analgesic required for every patient will be recorded.

Postoperatively, sensory and motor block level will be recorded every 15 mins till 60 mins, half hourly till the third hour and then hourly till the end of 6 hours Patient will be discharged from the recovery room after complete resolution of the motor block.

Sample size-

A post hoc power analysis was conducted using the software package, GPower (Faul and Erdfelder 1992).The alpha level used for this analysis was $p<0.05$ and beta was 0.20. The post hoc analyses revealed the statistical power of 0.40 for this study for detecting a small effect, whereas the power exceeded 0.99 for the detection of a moderate to large effect size. Thus, there was more than adequate power (i.e., power > 0.80) at the moderate to large effect size level, but less than adequate statistical power at the small effect size level.

By using study Katiyar S et al[17] as a template and using the Time for Full Recovery of Motor Function as a parameter and expecting similar results, Power is coming out to be 0.86 and with effect size of 0.68 with 10% chance of error. The sample size of 50 each for two groups will be taken i.e. total sample size will be 100.

OUTCOME:

PRIMARY OUTCOME:

- Onset and duration of sensory block.

- Onset and duration of motor block.
- Haemodynamic parameters i.e. Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Heart Rate (HR) and Peripheral Oxygen Saturation (SpO_2) and Mean arterial pressure (MAP).

SECONDARY OUTCOME:

- .Postoperative VAS score at 2^{nd}, 4^{th} and 6^{th} hour.

STATISTICAL ANALYSIS

Data will be described in terms of range; mean ±standard deviation (± SD), median, frequencies (number of cases) and relative frequencies (percentages) as appropriate. Comparison of quantitative variables between the study groups will be done using Student t-test and Mann Whitney U test for independent samples for parametric and non-parametric data respectively. For comparing categorical data, Chi square ($\chi 2$) test will be performed and exact test was used when the expected frequency is less than 5. A probability value (p value) less than 0.05 will be considered statistically significant. All statistical calculations will be done using SPSS (Statistical Package for the Social Science) SPSS 21 version statistical program for Microsoft Windows.

7.3 DOES THE STUDY REQUIRE ANY INVESTIGATIONS OR INTERVENTIONS TO BE CONDUCTED ON PATIENTS OR OTHER HUMANS OR ANIMALS? IF SO, PLEASE DESCRIBE BRIEFLY.

No

7.4 HAS ETHICAL CLEARANCE BEEN OBTAINED FROM YOUR INSTITUTION IN CASE OF 7.3?

Not applicable.

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PROFORMA

Serial No.

Treatment Group:

Name :

Date of surgery :

Husband's/Father's Name :

Admission No. :

Age &Sex :

Date of Admission :

Address :

Weight:

Height :

BMI :

Diagnosis :

Operation :

Present History:

Past History

Diabetes (Y/N)

Hypertension (Y/N)

IHD (Y/N)

Bronchial Asthma (Y/N)

TB (Y/N)

Drug Allergy (Y/N)

Renal Disease (Y/N)

Epilepsy (Y/N)

Personal History

Smoking (Y/N)

Alcohol (Y/N)

Drug Abuse (Y/N)

Signature of candidate

Signature of supervisor

History of previous surgery:

Date :

Anaesthesia :

Complications (if any):

General Physical Examination:

Consciousness level	Built & Nutrition
Pulse (bpm)	Respiratory Rate (/ min)
Blood Pressure (mm of Hg)	Temperature (^{0}F)
Pallor	Cyanosis
Oedema	Jaundice
Lymphadenopathy	Clubbing
Breath Holding Time (seconds)	
Thyromental Distance (cm)	Back
Mouth Opening	Spine
Temporomandibular Joint Mobility	

Mallampati Score I II III IV

Systemic Examination

Cardiovascular System

Respiratory System

Central Nervous System

Gastro-intestinal System

Signature of candidate

Signature of supervisor

Investigations	Pre-operative	Post-operative (If needed)
Hb, TLC, Platelet count		
Blood Sugar		
Renal Function Tests		
Serum Electrolytes		
Urine R/E		
PTI		
ECG		
X-Ray Chest		
Others		

ASA Grade I, II

Signature of candidate

Signature of supervisor

INTRAOPERATIVE

I. HAEMODYNAMIC OBSERVATIONS

Time in mins	0	5	10	15	30	45	60	75	90
HR (per min)									
SBP(mmHg)									
DBP (mmHg)									
MAP (mmHg)									
RR (per min)									
SpO_2 (%)									

Signature of candidate

Signature of supervisor

II. Level of Sensory block

Time (mins)	0	5	10	15	30	45	60	75	90
Sensory level									

Maximum level of sensory block

Time to attain maximum level of sensory block

III. Level of Motor block

Time in mins	0	5	10	15	30	45	60	75	90
Bromage score									

Time to attain maximum motor block

Signature of candidate

Signature of supervisor

POSTOPERATIVE

I. HAEMODYNAMIC OBSERVATIONS

TIME	0 min	15 mins	30 mins	45 mins	60 mins	2 hours	3 hours	4 hours	5 hours	6 hours
Heart rate (per min)										
Systolic (SBP) (mm Hg)										
Diastolic (DBP) (mm Hg)										
Mean Arterial Pressure (MAP in mm Hg)										
Respiratory rate(RR) (per min)										
% Oxygen saturation (SpO_2)										

Signature of candidate

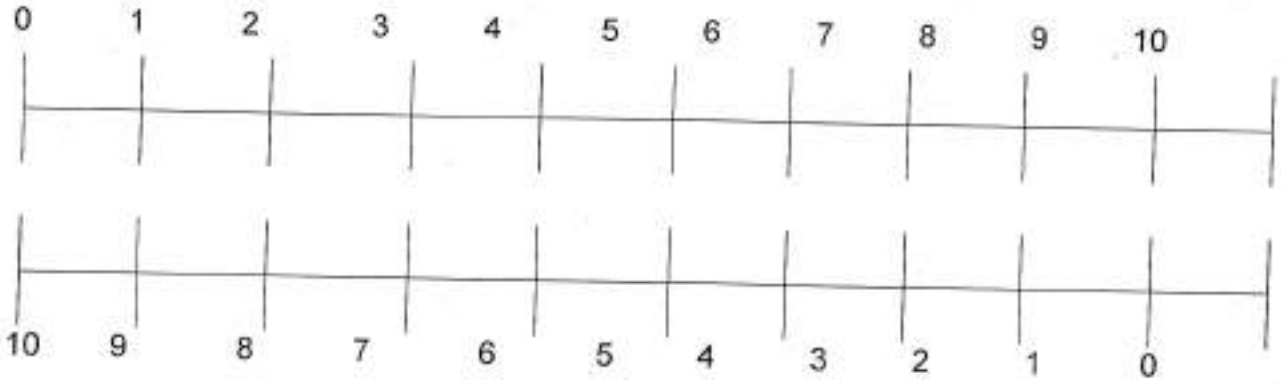
Signature of supervisor

II. Analgesia (VAS score)

Time	0 min	15 mins	30 mins	45 mins	60 mins	90 mins	120 mins	150 mins	3 hours	4 hours	5 hours	6 hours
VAS score (0 to 10)												

(Time of first analgesia request)

Visual analogue scale



Signature of candidate

Signature of supervisor

III. SENSORY BLOCK

Time	0 min	15 mins	30 mins	45 mins	60 mins	90 mins	120 mins	150 mins	3 hours	4 hours	5 hours	6 hours
Level of sensory block												

Time of Regression to T-12 level

IV. MOTOR BLOCK

Time	0 min	15 mins	30 mins	45 mins	60 mins	90 mins	120 mins	150 mins	3 hours	4 hours	5 hours	6 hours
Level of motor block												

Time until full recovery of motor function (bromage score 0)

Signature of candidate

Signature of supervisor

Side effects

Nausea/ vomiting	
Pruritis	
Shivering	

Signature of candidate

Signature of supervisor

INFORMED PATIENT CONSENT

Date: _____

I.....D/o, W/o, S/o.....

.....am willing to participate in the study **"A COMPARATIVE STUDY OF INTRATHECAL MAGNESIUM SULPHATE VERSUS INTRATHECAL FENTANYL AS AN ADJUVANT TO BUPIVACAINE"** The procedure with its complications has been explained to me in local vernacular language. Random allocation into either of two study groups of 100 patients each will be done by computer generated randomization codes contained in sealed, sequentially numbered envelopes. I have fully understood that no special tests and extra expenditure in any form, merely for the purpose of thesis is being carried out. I am free to opt out the study any time without assigning any reason.

.....
Signature of the Witness

Name:

.....
Signature of the patient

Signature of Supervisor

Signature of Candidate

मरीज अनुमति फार्म

तिथि _____

मैं _____ पत्नी/पुत्र/पुत्री _____

निवासी _____

इस शोधकार्य **"A COMPARATIVE STUDY OF INTRATHECAL MAGNESIUM SULPHATE VERSUS INTRATHECAL FENTANYL AS AN ADJUVANT TO BUPIVACAINE"** में भाग लेने के लिए सहमत हूँ। मैं इस शोधकार्य में भाग लेने के लिए अपनी स्वेच्छा से तैयार हूँ। मैं पुष्टि करता/करती हूँ की यह स्वीकृति देने के लिए मुझे कोई आर्थिक प्रलोभन नहीं दिया गया और न ही दबाव डाला गया है। मुझे इस शोधकार्य का उद्देश्य स्पष्ट कर दिया गया है और मुझे यह विश्वास है की यह विज्ञान और मानवता के लाभ के लिए है। मुझे इस शोधकार्य में होने वाले जोखिम के बारे में समझा दिया गया है और मेरी समझ में यह जोखिम बहुत मामुली है। 100 मरीजों के दो अध्ययन समूहों में से किसी एक में यादृच्छिक आवंटन प्रत्येक कंप्यूटर द्वारा उत्पादित यादृच्छिक कोड द्वारा सीलबंद, अनुक्रमिक रूप से क्रमांकित लिफाफे में निहित किया जाएगा।

मैं इस शोधकार्य में भाग लेने के सम्बन्ध में किसी भी समय अपनी अस्वीकृति व्यक्त कर सकता/सकती हूँ और मेरे अस्वीकृति व्यक्त करने का मेरे इलाज पर कोई प्रभाव नहीं पड़ेगा।

_____ _____

गवाह के हस्ताक्षर रोगी के हस्ताक्षर/अंगूठे का निशान

नाम: नाम:

_____

अन्वेषक के हस्ताक्षर

_____

विद्यार्थी के हस्ताक्षर

ਮਰੀਜ਼ ਰਜ਼ਾਮੰਦੀ ਫਾਰਮ

ਮਿਤੀ_____

ਮੈ_____ਪਤਨੀ/ਪੁੱਤਰ/ਪੁੱਤਰੀ_____

ਵਾਸੀ _____

"A COMPARATIVE STUDY OF INTRATHECAL MAGNESIUM SULPHATE VERSUS INTRATHECAL FENTANYL AS AN ADJUVANT TO BUPIVACAINE" ਤੇ ਚਲ ਰਹੀ ਖੋਜ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਰਜ਼ਾਮੰਦ ਹਾਂ। ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਲਈ ਮੈ ਆਪਣੀ ਮਰਜ਼ੀ ਨਾਲ ਤਿਆਰ ਹਾਂ। ਮੈ ਇਹ ਦਸਣਾ ਚਾਹੁੰਦਾ ਹਾਂ/ ਚਾਹੁੰਦੀ ਹਾਂ ਕੇ ਇਹ ਰਜ਼ਾਮੰਦੀ ਦੇਣ ਵਾਸਤੇ ਮੈਨੂ ਕਿਸੇ ਵੀ ਤਰਾਂ ਦਾ ਲੋਭ-ਲਾਲਚ ਨਹੀ ਦਿੱਤਾ ਗਿਆ ਅਤੇ ਨਾ ਹੀ ਕੋਈ ਦਬਾ ਪਾਇਆ ਗਿਆ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਦਾ ਮਨੋਰਥ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਭਰੋਸਾ ਦਵਾਇਆ ਗਿਆ ਹੈ ਕੇ ਇਹ ਖੋਜ ਵਿਗਿਆਨ ਅਤੇ ਮਾਨਵਤਾ ਦੀ ਭਲਾਈ ਲਈ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਵਿਚ ਹੋਣ ਵਾਲੇ ਖਤਰੇ ਬਾਰੇ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ ਅਤੇ ਮੈਨੂ ਇਹ ਯਕੀਨ ਹੈ ਕੇ ਇਹ ਖਤਰਾ ਬਹੁਤ ਮਾਮੂਲੀ ਹੈ। ਮੈਨੂ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਦਾ ਢੰਗ – ਤਰੀਕਾ ਸਮਝਾ ਦਿੱਤਾ ਗਿਆ ਹੈ। ਸੀਮਬੱਧ, ਕ੍ਰਮਵਾਰ ਅੰਕਿਤ ਲਿਫ਼ਾਫ਼ੇ ਵਿੱਚ ਸ਼ਾਮਲ ਕੰਪਿਊਟਰ ਦੁਆਰਾ ਤਿਆਰ ਕੀਤੇ ਰੈਂਡਮਾਈਜੇਸ਼ਨ ਕੋਡ ਦੁਆਰਾ 100 ਰਿਸਤਿਆਂ ਦੇ ਦੋ ਅਧਿਐਨ ਗਰੁੱਪਾਂ ਵਿੱਚ ਰਲਵੀਂ ਅਲੋਕੇਸ਼ਨ ਕੀਤੀ ਜਾਵੇਗੀ.

ਮੈ ਇਸ ਖੋਜ ਕੰਮ ਵਿਚ ਹਿੱਸਾ ਲੈਣ ਬਾਰੇ ਆਪਣੀ ਰਜ਼ਾਮੰਦੀ ਕਿਸੇ ਵੀ ਸਮੇ ਵਾਪਸ ਲੈ ਸਕਦਾ ਹਾਂ/ ਸਕਦੀ ਹਾਂ ਅਤੇ ਮੇਰੀ ਰਜ਼ਾਮੰਦੀ ਵਾਪਸ ਲੈਣ ਦਾ ਮੇਰੇ ਇਲਾਜ ਤੇ ਕੋਈ ਅਸਰ ਨਹੀ ਹੋਵੇਗਾ।

_____ _____

ਗਵਾਹ ਦੇ ਹਸਤਾਖਰ ਮਰੀਜ਼ ਦੇ ਹਸਤਾਖਰ

ਮਿਤੀ_____ ਮਿਤੀ_____

ਪਤਾ _____ ਪਤਾ _____

_____

ਨਿਰੀਖਕ ਦੇ ਹਸਤਾਖਰ

_____

ਸਿਖਿਆਰਥੀ ਦੇ ਹਸਤਾਖਰ